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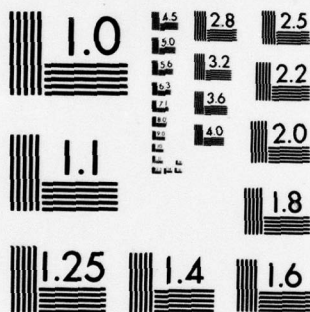
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The Economics of FMS:
An Analysis of the Impact of
FMS Policy Changes

THESIS

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Stephen A. Henry
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The Economics of FMS:
An Analysis of the Impact of
FMS Policy Changes.

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Preface

The writing of this thesis has been a rewarding learning experience. However, it would not have been possible without the help of many very fine people. Their names are too numerous to list, but I would especially like to thank Mr. Al Gobel and Lt Colonel William C. Letzkus. Mr. Gobel was instrumental in setting up the interviews and provided a wealth of background information on foreign military sales. Lt Colonel Letzkus was my thesis advisor and aided my research efforts significantly with his timely comments and suggestions.

Last, but not least, I would like to thank my wife, Maxine, and children Laura and Robbie. For the past 16 months they have provided me with unselfish and loving support while I completed my course work and thesis. Their support and love during this time was deeply appreciated.

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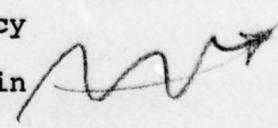
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Abstract

→ This research effort was conducted to analyze the potential impact of several recent foreign military sales (FMS) policy changes on the Defense Industrial Base (DIB) and in turn the Department of Defense (DOD). Policy changes examined included the deletion of the one to four percent profit factor for FMS contracts from the weighted guidelines profit formula and President Carter's 16 May 1977 policy statement on conventional arms transfers.

The analysis of the effects of FMS policy changes began by examining the effects of FMS on the US economy, US government, and the DIB. This portion of the research effort provided the background for the evaluation of the effects of the FMS policy changes. FMS has a significant effect on the US economy, government, and DIB. FMS directly affects the gross national product, balance of trade, unemployment rates, and several other economic indicators. The US government/DOD incur significant cost savings on foreign military sales from R&D recoupments, tax recoupment, shared overhead costs, learning curve effects, and reduced production line closings and openings. The DIB is strongly ^A affected by the volume and value of foreign military sales. In fact, some sectors of the DIB are economically dependent on FMS.

↖ Information concerning the effects of FMS policy changes on the aerospace industry/DIB was obtained in 

interviews and discussions with 15 government personnel who work directly with FMS contracts. The interview responses indicated that the FMS policy changes examined have had very few short term effects on the DIB. However, several of the changes do have the potential to significantly affect the DIB in the long term. The deletion of the FMS profit factor and the proposed ban on modifications of advanced weapon systems for FMS appear to have the greatest potential to economically affect the DIB. The reduction in profits as yet has had little effect on the DIB, but could lead to further erosion of the DIB. The ban on modifications could significantly affect the volume of current and future foreign military sales. The FMS ceiling and the ban of R&D solely for FMS have some effects on the DIB, but the effects appear to be less dramatic.



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THE ECONOMICS OF FMS:
AN ANALYSIS OF THE IMPACT OF FMS POLICY CHANGES

I. FMS LEGISLATIVE HISTORY

Lend-Lease

The evolution of the present foreign military sales (FMS) programs began in 1940. In the autumn of that year, the British treasury disclosed that its financial resources were so depleted that it would not be able to pay for American munitions and armaments necessary for waging war. This announcement presented the United States government with a difficult political and moral dilemma; since the 1935 Neutrality Act, modified in 1939, permitted shipments of arms to belligerents only on a cash and carry basis. However, this dilemma was ended by President Roosevelt's 1941 state of the union address in which he advocated continued aid to the Allies on the basis of our own national defense and considerations of morality (Ref 58:262).

In response to the President's address, House Resolution 1776 was introduced in late January of 1941. This bill, more commonly known as the Lend-Lease Act, authorized the President to manufacture and secure defense articles for foreign governments whose defense was deemed vital to the United States. In short, the Lend-Lease Act represented a shift in US foreign policy.

Lend-Lease was an ingenious device to aid the allies short of war, to organize the expansion of the war industry in the United States while still nominally neutral, to develop a system of procurement through the government and thus prevent an excessive rise of the prices of war goods, and to unite the public opinion behind a positive foreign policy (Ref 58:263).

The Lend-Lease Act met most of these objectives, but more importantly it prepared the US for its eventual entry into the war.

The US entered the war in December of 1941, but continued to deliver war material under the auspices of the Lend-Lease Act until Japan's surrender in August of 1945. The total value of these deliveries exceeded 49 billion dollars, most of which was never repaid due to the poor economic conditions in Europe. As a result of this experience, most post war economic and military assistance was in the form of grant aid.

Security Assistance Plans

In 1947 the National Security Act created the military assistance programs (MAP). These programs were grant aid loans, with no obligation for repayment, and were designed to assist nations in repelling communist aggressions. The first recipients of this aid were Greece and Turkey, but eventually the programs were extended to other of our allies such as the Philippines and China. This legislation, commonly referred to as the "Truman Doctrine", is generally accepted as the United States' initial commitment to the

principle of collective security and is recognized as the genesis of later security assistance programs (Ref 47:5).

The Economic Cooperation Act was enacted in 1948. This act, known as the "Marshal Plan", was designed to provide non-military economic assistance to war torn Europe. However, military aid soon became available when, in 1949, the US entered into a mutual security pact called the North Atlantic Treaty Organization (NATO).

Following the creation of NATO, President Truman appealed to Congress for legislation that would provide military aid to our allies. As a result of this appeal, the Mutual Defense Act of 1949 was passed. This act authorized military grant aid to countries considered vital to the defense of the US and permitted sales of military equipment to other friendly countries. This authority was continued throughout the 1950's by a sequence of mutual security acts which broadened in scope as the US joined other collective security pacts such as the Rio Pact, South East Asia Treaty Organization (SEATO), and Australia-New Zealand-United States (ANZUS).

The mutual security acts of the 1950's, even though oriented towards grant aid, provided some direction and control for foreign military sales programs. Notable legislative provisions included the creation of the Commercial Munitions Export Control List, which is still in effect today (1978), and the Credit Sales Revolving Fund.

However, these actions had little effect on foreign military sales until fiscal year 1958. Prior to this time, foreign military sales were negligible primarily due to the slow recovery of the European economy and the US pricing policies in effect at the time. The establishment of more competitive pricing policies and the economic recovery of several European allies bolstered foreign military sales during the late 1950's, but grant aid remained the dominate arms transfer mode into the 1960's (Ref 49:52).

Foreign Assistance Act of 1961

In the early 1960's there was a growing public concern about the size and value of the US "give away" programs (grant aid). These programs, especially military assistance programs, came under scrutiny because of their drain on the economy, their unfavorable impact on the balance of payments, and their adverse reduction of supplies and equipment available to the US armed services. As a result of this scrutiny, the Kennedy administration proposed certain changes in the legislative structure and execution of foreign assistance programs. These changes were implemented in the Foreign Assistance Act of 1961 (FAA/61) and were designed to give new vigor, purpose, and direction to the US foreign aid programs.

Following the 1961 act, there was a vigorous export sales program in the United States (Ref 44:78). This program was managed by the Office of International Logistics

Negotiations which was created by Secretary of Defense McNamara to promote the sale of military equipment abroad. In pursuing its objectives, this office actively engaged in a sales campaign which included participation in international trade shows, aggressive salesmanship, and the arrangement of financing for purchasing nations.

Further emphasis on FMS was given by instructions issued to the secretaries of the military services in 1963. In these instructions the Defense Secretary stressed the objectives to be met in foreign military sales as:

(1) Promote the defensive strength of our allies, consistent with our political-economic objectives, (2) Promote the concept of cooperative logistics and standardization with our allies, and (3) Offset the unfavorable balance of payments resulting from essential US military deployment abroad (Ref 35:2).

These instructions resulted in a rapid growth in foreign military sales (FMS) and a corresponding reduction in military assistance programs (MAP). In the period from 1964 to 1968 foreign military sales doubled, reaching one billion dollars in 1968. Correspondingly, MAP grant aid decreased from 1.2 billion to 780 million dollars. The combined efforts of the Office of International Logistics Negotiations and the Department of Defense accomplished their objectives and pushed FMS into the premier position over grant aid.

Foreign Military Sales Act of 1968

The rapid growth of foreign military sales in the 1960's was not without its problems. The government's aggressive salesmanship and liberal financing of arms exports raised considerable congressional interest, which eventually culminated in cries for reform. Strong support for these reform measures was provided in 1967 by a Senate Foreign Relations Committee report which cited lack of information, poor interdepartmental coordination, and a failure to reconcile arms control policies within the arms sales programs (Ref 59:12). The Foreign Military Sales Act of 1968 (FMSA) was passed as a direct result of the Senate report and the growing congressional dissatisfaction with the then existing state of affairs.

The FMSA was intended to consolidate and revise the provisions of the Foreign Assistance Act of 1961 concerning reimbursable military exports. As such, the bill brought together all legislation dealing with foreign military sales into a single statute. The FMSA provided both the administrative mechanism and the general legislative authority to meet the demands of the drastically expanded foreign military sales program. In addition, the act was also responsive to the congressional concerns that a large military sales program, unless carefully managed, would contribute to the development of regional arms races and tensions (Ref 51:11).

In short, the 1968 FMSA provided additional guidance and control for foreign military sales. Financial controls were tightened by closing out the Credit Sales Revolving Fund, restricting Export-Import Bank loans to developing countries, and by placing more stringent controls and ceilings on the types of foreign military sales permissible (Ref 49:55). In addition, the act limited the government's role in arms sales. The government's foreign military sales marketing efforts were significantly reduced and limited to responses to specific requests by prospective buyers. Further restrictions mandated a thorough review of each FMS case prior to presidential approval of a sale. This review was intended to determine the sale's consistency with US foreign policy and the purchasing country's need and ability to pay. In summary, the intent of the Foreign Military Sales Act of 1968 was to reduce the government's involvement in foreign military sales to that of providing military advice, participating in the planning for common defense, and assisting in the controlling of international arms traffic.

Nixon Doctrine

The "Nixon Doctrine" was introduced in President Nixon's 1972 state of the union address. In this address he emphasized that strong foreign assistance programs were an essential part of the American strategy for peace. This

strategy called for assisting our allies towards self-reliance, their assumption of a greater share of the common defense burden, and a strong emphasis on foreign military sales (FMS) to facilitate these objectives. To implement this policy the Defense Security Assistance Agency (DSAA) was established to administer both the grant aid and sales programs. As a result, foreign military sales continued their rapid growth and usefulness as a tool of US foreign policy.

Congressional Influence

In the 1970's foreign military sales continued, but under intense congressional scrutiny. With each annual appropriation cycle Congress demanded and obtained a greater role in US foreign policy decisions and foreign military sales. As a result, congressional approval is now required on virtually all foreign military sales. In addition, Congress has implemented US foreign policy by mandating a six month suspension on FMS to the Middle East and increasing the restrictions on commercial export sales.

Arms Export Act of 1976

The International Security Assistance and Arms Export Control Act of 1976 (AECA) is not a bill in its own right, but a fiscal year 1977 authorization act which amended the Foreign Military Sales Act of 1968 and the Foreign Assistance Act of 1961. It is, however, a comprehensive and far

reaching piece of legislation which made sweeping changes in foreign military sales policy. Appendix A summarizes the major policy provisions of the AECA.

One of the most notable changes was a substantial change in US foreign policy concerning grant aid. The act represents the first positive action to phase out military assistance programs (MAP). Under this act all military assistance programs were to be terminated on 30 September 1977 unless specifically authorized by Congress (Ref 60:1385). The bill also reconstructed the US arms sales policies so as to provide more congressional supervision and review. Specific provisions included (1) a nine billion dollar yearly ceiling on foreign military sales; (2) the restriction of the sale of major defense items to government-to-government transactions; (3) required annual reports on the justification and levels of all arms sales; (4) required reporting to the Secretary of State of all political gifts or contributions, paid or offered, to secure arms sales; and (5) a required presidential review of all US arms control policies within one year of enactment of the bill (Ref 60:1385-86).

Presidential Influence

As required by the 1976 Arms Export Control Act (AECA), President Carter conducted a comprehensive review of all military, political, and economic factors considered pertinent to US arms transfer policies. This review culminated

with President Carter's issuance of a policy statement to constrain arms exports. The text of this statement can be found in Appendix B. This statement established a set of controls for arms transfers which were applicable to all transfers except those between countries with which the US has major defense treaties. The following is a list of the key controls presented in President Carter's policy statement concerning conventional arms exports:

1. The dollar value of FMS in fiscal year 1978 will be reduced below fiscal 1977 levels.

2. The US will not be the first supplier of new and modern weapon systems into a region.

3. The development or significant modification of advanced weapon systems solely for export will not be permitted.

4. Coproduction agreements for military weapons, equipment, and major components of weapon systems (beyond those already in effect) are prohibited.

5. The US, as a condition of sale, will not entertain any request for retransfer of the weapon system.

6. Military representatives and embassies will not promote arms sales and actions of private agents promoting arms sales will require Department of State approval. (Ref Appendix B: B2). These controls were not presented in a legislative package, but were considered in subsequent security assistance legislation.

The International Security Assistance Act of 1977 amended both the 1961 Foreign Assistance Act and the Arms Export Control Act, but made less sweeping changes than AECA. It is also the first legislation to reflect President Carter's conventional arms transfer policy. Although not legislative in nature, President Carter's arms transfer policy is considered germane; since Congress considered it to some degree in drafting the 1977 act (Ref 47:12)

The 1977 act was modified by the President's policy statements, but it continued to reflect the growing participation of Congress in foreign policy decisions. Provisions peculiar to the 1977 legislation include (1) a specific dollar and resource level authority for FY 1978 security assistance programs, (2) a reduction in military assistance groups (MAG) from 34 to 15, and (3) a requirement for additional reports by the President on the impact of US foreign arms sales on the US national security and defense readiness (Ref 47:12). These provisions and other congressional and executive actions reflect a further tightening of controls on the foreign military sales market.

Summary

The type, value, and complexity of FMS have changed in the last 40 years. FMS began with Lend-Lease, which provided grant aid to the allies during the war. Grant aid continued through the 1950's, but in the form of Military Assistance Programs (MAP) which aided and strengthened

our allies' defensive postures. The 1960's were characterized by a preference for foreign military sales over grant aid. This continued the rapid growth of FMS and set the stage for the changes of the 1970's.

In the 1970's the magnitude of FMS directly affected US economic and foreign policy decisions. Concerns about the large dollar value of arms exports resulted in increased executive and legislative control of arms exports. One of the most notable changes was the dramatic increase in congressional control over foreign policy decisions through its FMS legislation. This legislation, coupled with executive restrictions, has effectively used FMS in US foreign policy. However, this legislation has also created problems which have had an impact on the US arms industry.

II. METHODOLOGY

The Defense Industrial Base

In the United States there are many sectors of the economy and industry which cater to specific types of production and sales. One such sector is the Defense Industrial Base (DIB). The DIB has been defined as those companies that supply the material needs of the peace time armed services (Ref 14:1). Individual companies within the DIB are privately owned and are supported in varying degrees by the government's purchase of their respective products. In short, the DIB is a sector of American industry which is devoted to producing and selling defense material; but, more importantly, it is a sector of American industry which is capable of supplying high technology equipment in response to Department of Defense (DOD) requests.

The DIB was maintained during the 1960's and early 1970's by a high volume of defense contracts. In most cases the intense competition among DIB companies to obtain these contracts reduced the prices bid on the contracts. The number of participating companies provided the DOD with the ability to purchase equipment on the basis of performance as well as cost. However, these benefits and savings have been degraded during the mid 1970's by a significant erosion of the DIB.

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Erosion of the DIB

In Department of Defense procurements erosion is said to exist when the DOD cannot obtain the required system performance in a timely manner and at a reasonable price (Ref 14:1). This erosion is characterized by a reduction in the number of companies competing for defense contracts and the inability of industries to respond rapidly to DOD requests due to the commitment of resources to investments and other commercial contracts. These changes in industry orientation affect the ability of the government to meet its objectives and represent a growing concern among DOD policy makers.

The DOD concern about erosion of the DIB has been expressed in studies such as Profit "76" (1976) and The Defense Industrial Base (1977). These studies investigated the profitability of the DIB and the extent of its erosion. The studies indicated that although erosion varied with each industry, in general most degradation occurred in the areas of reduced capital investments, limited research and development efforts, and a decreasing number of high performance companies seeking government contracts. Specific causes for this erosion included low profit levels on defense contracts, reduced military spending, and a sagging US economy. Many defense contractors, especially those with a low volume of defense contracts, were forced to choose commercial rather than defense business (Ref 14:1).

FMS and the DIB

One factor which has retarded the erosion of the DIB has been the economic support provided by foreign military sales. In the 1970's foreign military sales increased dramatically; growing from 1.3 billion dollars in 1970 to 8.2 billion dollars in 1976. The US Council on Economic Priorities reports:

In 1976, the 10 leading foreign military sales contractors received 3.4 billion dollars in foreign contracts or an average of roughly 30% of their total military business (Ref 33:60).

The same report also stated that six of the companies -- Northrop, Grumman, Litton, GE, Hughes, and Lockheed -- reported increases in their FMS contracts as a percentage of their total military sales. Three other companies -- McDonnell Douglas, Raytheon, and Ford Motor Company -- reported no change. Only Textron reported a decrease in FMS contracts (Ref 33:60).

Two major reasons for the increasing dependence on FMS by major defense contractors are (1) the reduced value and number of US military contracts and (2) the booming arms market in the Middle East. As the value and number of US military contracts declined defense contractors sought business in the foreign military markets. Foreign military sales has been a lucrative market for defense contractors; and, until recently, participation had been strongly encouraged by the US Government because of the strong economic

support provided by FMS to the Defense Industrial Base and the US economy.

Problem

The total dollar value of FMS has leveled off due to legislative restrictions. Recent efforts by President Carter and the Congress to increase their control over FMS and to reduce the United States role in the world arms market have accelerated rather than further retarded the DIB's erosion. Specific actions include the deletion of the FMS profit factor from the weighted guide lines profit formula, the placement of a maximum ceiling on the annual dollar value of FMS and the tightening of government regulations concerning FMS marketing and product development. These changes in FMS policy economically impact the DIB and may very well affect its viability.

The economic effects of the recent FMS policy changes on the DIB are varied and potentially significant. The changes affect areas of DOD concern such as levels of research and development efforts, capital investments, product selection, and contractor participation in the DIB. However, as yet the economic effect of these changes is unclear.

Objectives

The purpose of this thesis will be to evaluate the economic impact and effects of proposed and recently enacted

changes in FMS policy on the Defense Industrial Base and in turn on the DOD. There are two specific objectives:

1. The primary objective is to analyze and evaluate the potential economic impact of recent FMS policy changes on the aerospace industry.

2. In order to provide a background and basis from which economic analyses and evaluations of FMS policy changes can be made, the second objective of this study is to demonstrate the extent of economic support provided by FMS to: (a) the US economy, (b) the US government, and (c) the Defense Industrial Base.

Scope

The economic effects of FMS are extensive, but this study will only address the effects on three major areas: the US economy, the US government, and the Defense Industrial Base. For purposes of this study the economic effects of FMS on the US economy will include the balance of trade, employment, and the US gross national product (GNP). The economic effects on the government will include budgetary cost savings to the Department of Defense and federal tax recoupments. The effects on the DIB will include industry profits and the industry's commitment of its resources to capital investments and R&D efforts.

As stated above, the primary objective of this thesis is to analyze and evaluate the potential economic impact of recent FMS policy changes on aerospace contractors. To the

of other DIB industries, it is hypothesized that the findings of this study can be applied in general to the DIB as a whole.

It is realized that many FMS policy decisions are political in nature. However, it is beyond the scope of this thesis to try to evaluate the political costs and benefits of FMS policies.

Many programs such as the F-16 have offset agreements. Although offset agreements are economic in nature, measurement of their costs and benefits is a complicated issue and will not be covered in this study.

Research Methodology

The research for this thesis was primarily accomplished by a study of relevant literature and interviews with personnel associated with FMS efforts. The literature search involved a review of the pertinent literature in the areas of foreign military sales and was significantly aided by two separate bibliographical computer searches. The literature search specifically reviewed pertinent directives, regulations, policy statements other research efforts. related to the economics of FMS. The literature forms a major source of information for this thesis.

The interviews were conducted with 15 government procurement and pricing specialists. Thirteen of the interviews were conducted directly with individuals working in in Aeronautical Systems Division at Wright-Patterson Air Force Base, Ohio. The other two interviews were conducted over

the telephone with the administrative contracting officer (ACO) at the Lockheed and Northrop facilities. Interview topics included the deletion of the one to four percent profit factor for FMS on the weighted guidelines, President Carter's FMS policy statement, pertinent congressional legislation, and the economics of FMS. The complete list of topics and questions is found in Appendix C.

The information gathered from the interviews forms the primary source of information concerning the effects of the FMS policy changes on defense industries. In addition, the interview discussions supplemented the literature search by providing information about specific FMS programs and FMS in general. Non-attribution was promised in each interview. As a result, specific sources of some information will thus not be cited.

Limitations

The most significant limitation of this study is that only government personnel were interviewed. Time and money constraints precluded interviews of defense industry representatives. Consequently, some of the results of this thesis reflect conjecture of government personnel about the defense industries rather than the views of the defense industries themselves.

Assumptions

There are two assumptions relevant to this study. The first is that foreign military sales will continue. There

are several political elements that wish to eliminate or drastically reduce FMS, but it appears that FMS will continue at least for the immediate future.

The second assumption is that the aerospace industry is a representative sample of the DIB. Aerospace contractors employ many of the same skills found in other DIB industries and currently manufacture a major portion of the US's foreign military sales. Consequently, this study uses the aerospace industry as a representative sample of the DIB.

Use of Appendices

The appendices are intended to supplement the information found in the text of the thesis. Appendix A is a summary of the major policy provisions of the Arms Export Control Act of 1976. Appendix B is the text of President Carter's 19 May 1977 policy statement on arms exports. Appendices A and B together represent most of the recent policy the President and the Congress have imposed on foreign military sales.

Appendix C is the questionnaire used in the thesis interviews. It is intended to show the format in which the information on FMS policy changes was obtained.

Appendix D is a supplement to the tables and figures found in the text of the thesis. The tables in Appendix D are numbered to correspond to the table which they supplement unless otherwise noted.

Research Presentation

Chapters I and II are the introduction to the thesis. Chapter I presents the legislative history of FMS from 1940 to present. Chapter II is the methodology chapter for the thesis.

The economic effects of foreign military sales are felt throughout the US economy. The extent and method in which FMS affects the US economy will be examined in Chapter III.

Chapter IV examines the economic effects of FMS on the US Government/DOD. Government savings are generated through R&D cost recoupment, learning curve effects, economies of scale, shared overhead costs, tax recoupments, and a reduced number of production line closings and openings.

Foreign military sales also represent a growing portion of the DIB's military sales. This increasing dependence on FMS directly affects the defense industry's policies and decisions concerning investments, research and development (R&D), and product selection. In addition, the risks, profits, and volume of foreign military sales are normally considered in the choice between defense and commercial contracts. A discussion of the economic effects of FMS on the DIB is found in Chapter V.

The analysis of the potential economic impact of FMS policy changes is covered in Chapter VI. The chapter covers both enacted and proposed changes in FMS policies. The

assessment of the impact on the aerospace contractors provides the basis for a hypothesis about the impact of the policy changes on the DIB.

Chapter VII presents the conclusions and summary of the thesis. It contains recommendations for further studies and a condensed economic review and evaluation of the FMS policy changes addressed in the thesis.

III. FMS AND THE US ECONOMY

Foreign military sales are exports of US military goods and services. Like other exports, foreign military sales have an effect on the US economy. This influence has significantly increased, however, with the growth of foreign military sales in the 1970's. FMS directly affects the US gross national product (GNP), balance of trade, unemployment rates, and other economic indicators. In addition, the influence of FMS on these indicators is significantly expanded by the multiplier effect.

FMS and the GNP

The gross national product (GNP) represents the market value of all goods and services produced within a nation for a given year. The GNP is calculated by adding the purchases of final goods and services by individuals, corporations, and governments to the net trade balance. Since US arms exports historically have had a positive trade balance, foreign military sales are normally considered a positive contribution to the GNP.

Multiplier Effects

The multiplier effect is a phenomenon which magnifies the impact of an increase or decrease in purchases of US goods and services on the US economy. The multiplier effect is based on the assumption that there will be a secondary expansion of production beyond the initial expenditure. This

assumption is true any time a company consumes a portion of its additional income from the initial expenditure on other US goods and services. As an example, assume the aerospace industry has just received an additional billion dollars in FMS orders. If the aerospace industry's marginal propensity to consume US final goods and services is one-half, there will be 500 million dollars of new income for the producers of the goods the aerospace industry consumes. In turn, as these producers consume one-half of their income on other US final goods and services, there will be 250 million dollars for the next set of producers to spend. If this series were taken until the value of the additional expenditures became insignificant, the total value of the multiplier effect would be twice the original expenditure. However, these lengthy calculations can be avoided by simply calculating the multiplier coefficient (MC).

By definition the multiplier coefficient (MC) is the number by which the change in investment or purchases must be multiplied by in order to calculate the resulting impact on the economy (Ref 54:223). The multiplier coefficient is normally calculated using the formula:

$$MC = 1/(1-R)$$

The "R" represents the public's marginal propensity to consume additional income and is given as the fraction of that additional income that will be spent on American goods and services. This formula yields a multiplier coefficient

(MC) of one when none of the additional income is spent on US goods and services. The MC approaches infinity when nearly all of the income is spent on US goods and services. However, neither extreme is probable since any additional income is consumed in some combination of US goods and services, savings, taxes, and foreign imports.

Applications

The multiplier effect applies to an exogenous expenditure on final goods and services in the US economy. The effect is the same regardless of whether the expenditure is made with private, government or foreign funds. For this reason the economic effects on the US economy of exports such as foreign military sales are greater than just the initial expenditure. However, the estimates of the impact of FMS on the US economy vary depending on the multiplier coefficient (MC) used.

In the US economy a multiplier coefficient of two is commonly used, but different sources have used MC's ranging from 1.9 to 2.5 in estimating the economic effects of different types of expenditures on the US economy. A 1969 Survey of Current Business study found a 1.94 multiplier coefficient for aerospace sales (Ref 48:18). Since aerospace sales represent a significant portion of the annual foreign military sales, a MC of 1.9 to 2 is probably appropriate for use with FMS. This means that over time the 8.2 billion dollars in 1976 FMS procure-

ments will probably generate additional expenditures in the US economy totalling 7.4 to 8.2 billion dollars. The potential effect on the US economy resulting from foreign military sales expenditures in the US economy between 1970 and 1976 can be seen in Table 3-1.

Balance of Trade

The balance of trade refers to the difference in the value of the imports and exports of a country. When there is a positive trade balance, the value of the exports exceeds the value of the imports. This condition results in a positive cash flow into the country's economy and an expansionary effect on the economy due to the increased expenditures and the multiplier effect. In contrast, a negative balance of trade occurs when the value of the imports exceeds the value of the exports. This condition reduces the amount of expenditures in the economy and causes a negative cash flow and an adverse effect on the value of the dollar relative to other currencies. An excellent example is the current trade deficit with Japan which has caused the value of the US dollar to fall relative to the Japanese yen.

Historically international trade has been an important and controversial issue. The Romans conquered much of the Middle East and Europe in efforts to develop trade and taxes to support the Empire. The economy of the British Empire was based solely on the Britians' ability to trade the

Table 3-1
FMS and Associated Multiplier Effects
(Millions of Current Dollars)

Year	FMS	Additional Expenditures ¹	Total Expenditures
1970	920	920	1840
1971	1652	1652	3304
1972	3251	3251	6502
1973	3778	3778	7556
1974	8904	8904	17808
1975	9406	9400	18812
1976	8200	8200	16400

1. The multiplier coefficient equals two.

(Adapted from The Defense Industrial Base: 34-36)

products of their colonies on an international basis. The present day Common Market is an excellent example of several European countries trying to develop international trade that is advantageous to all the parties involved. In short, international trade and more specifically the balance of trade plays an important role in the economies of most if not all the major countries of the world.

US Trade Balance

For the last 80 years the United States has been quite prosperous in the international trade markets. The demand for US products and technology has been consistently high. Technical advances in the agricultural, manufacturing, and scientific fields have enabled the US to establish an extensive world market for its goods and services. As a result of this demand for US products the US did not incur a single negative balance of trade between 1888 and 1970 and in most years the US economy prospered. However, since 1970 there have been five annual trade deficits including a record 26.5 billion dollar deficit in 1977. These deficits have occurred despite a growth in US exports. Table 3-2 shows the extent that the US GNP and US exports have grown and the recent trade deficits.

Two of the main reasons for trade deficits are increased competition for trade in the world markets and the rise in the price of oil. Countries such as Japan have been able to produce products such as steel and electronic equipment at

Table 3-2

US GNP and Trade Balance

Yr.	GNP (Billions)	%GNP Change From Previous Yr.	Trade Balance (Millions)	Exports % of GNP
1946-69	11718.6	6.45 ¹	98031	3.97
1970	982.4	5.0	2603	4.32
1971	1063.4	8.2	-2260	4.07
1972	1171.1	10.1	-6416	4.2166
1973	1306.6	11.6	911	5.465
1974	1413.2	8.2	-5369	6.956
1975	1516.3	7.3	9030	7.062
1976	1692.4	11.6	-7798	6.78
1977	1890 ²	10.8 ²	-26500	N/A

(Adapted from Table B-1 and Table B-95; The Economic Report to the President, January 1977.)

1. Average figure for Yrs. 1946-69.
2. (The Budget of the United States Government Fiscal Year 1979:31)

prices considerably less than equivalent products produced in the US. These low prices have in turn increased US imports of Japanese goods. In addition, the oil producing countries have taken advantage of the high demand for oil in the US and Western Europe and doubled the unit price for oil since 1974. As a result, Japan and the oil producing countries have built up a 54.5 billion dollar trade surplus with the US since 1970 (Ref 28:299). Table 3-3 shows the annual exports and imports to Japan and the petroleum exporting countries.

As indicated in Table 3-3, Japanese and oil imports are a major source of the recent US trade deficits. However, there are other sectors of the US economy which are exporting heavily and offsetting some of the large deficit accrued through Japanese and oil imports. In fact, the percentage of the GNP destined for export has steadily grown during the 1970's. A comparison of Tables 3-2 and 3-3 shows the extent that the growth in US exports in other sections of the US economy has offset the trade deficits accrued with Japan and the oil producing countries. As an example, in 1976 the US trade deficit with Japan and the oil producing countries was 18.1 billion dollars. However, the total US trade deficit was only 7.798 billion dollars; a difference of over 10 billion dollars.

Aerospace Trade Balance

Exports of aerospace products reached an all time high in 1976 when the aerospace industries recorded a 7.3 billion

Table 3-3
US Merchandise Exports/Imports
1970-76
(Billions)

Country	70	71	72	73	74	75	76	Total
<u>Exports</u>								
Japan	4.7	4.1	5.0	8.3	10.7	9.6	9.2	51.6
Oil Exporters	2.7	2.9	3.4	4.5	8.1	12.7	13.1	47.4
Total	7.4	7.0	8.4	12.8	18.8	22.3	21.3	99.0
<u>Imports</u>								
Japan	5.9	7.3	9.1	9.7	12.3	11.3	14.1	69.7
Oil Exporters	2.5	3.1	3.7	6.3	20.5	21.4	26.3	83.3
Total	8.4	10.1	12.8	16.0	32.8	32.7	40.4	153.5
Trade Balance	-1.0	-2.9	-4.4	-6.3	-14.0	-10.4	-18.1	-54.5

(Adapted from Table B-97, page 299 of Economic Report of The President, 1977.)

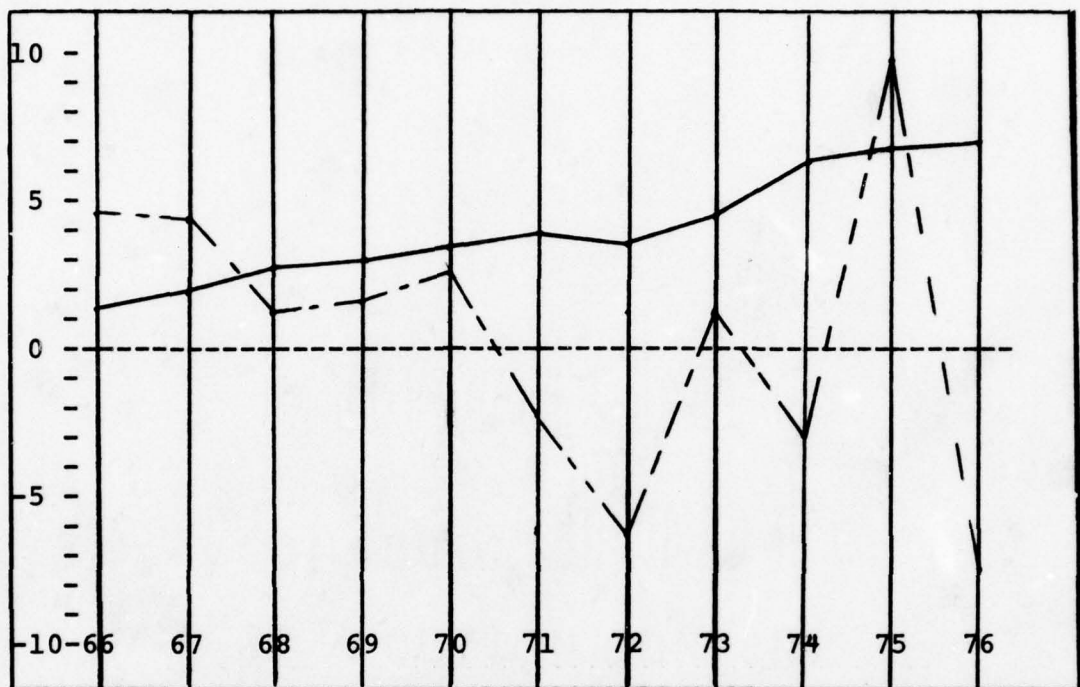
dollar trade surplus. In addition, 1976 represented the third straight year in which aerospace exports exceeded seven billion dollars. Figure 3-1 graphically shows the relationship between the aerospace industry's balance of trade and the US balance of trade.

As in previous years civilian aviation products accounted for the bulk of aerospace exports. In 1976 5.7 billion dollars (roughly 72 percent) of the aerospace exports were for shipments of civilian aircraft, engines, accessories, and other equipment (Ref 3:105). The other 78 percent or 2.2 billion dollars came from FMS and direct sales of military equipment. A breakout of aerospace exports into civilian and military exports for years 1970 through 1976 is presented in Table 3-4.

The relative percentages of civil and military aerospace exports have remained stable during the 1970's, but with some growth in the military sales percentage. The primary reason for the rise in the military sales percentage has been the relatively rapid growth of military exports in comparison to civilian exports. In 1975 and 1976 sale of the F-16 and the F-15 along with continued sale of the F-4, F-5, and C-130 pushed the annual dollar value of military sales above the two billion dollar mark. By 1978 aerospace military sales could reach four billion dollars with the 1.9 billion dollar sale of the F-16 to NATO and the package sale of the F-16 and F-15 to the Middle East. In short, military sales

Figure 3-1

Balance of Trade
(Billions of Dollars)



_____ Aerospace Balance of Trade

----- US Balance of Trade

Note: Detailed information can be found in Appendix D
Table 3-3a.

(Adapted from Aerospace Facts and Figures, 1977/78;
page 106.)

Table 3-4

Aerospace Exports
(Million of Dollars)

Year	Aerospace Exports	Civilian	Military	Military as a % of Aerospace Exports
1970	3405	2516	889	26.1
1971	4203	3680	1123	26.7
1972	3795	2954	841	22.1
1973	5142	3788	1354	26.3
1974	7095	5283	1822	25.6
1975	7792	5323	2469	31.7
1976	7859	5684	2175	27.7

Note: More detailed information is available in Appendix D, Table 3-4.

(Adapted from Aerospace Facts and Figures, 1977/78; page 19.)

are becoming a larger portion of the aerospace industry's exports.

Employment

The subject of unemployment is a sensitive political issue. Economists generally consider a four to five percent unemployment rate to be the full employment rate, but the US has not experienced this rate since the late 1960's. In fact, in the 1970's only twice, 1970 and 1973, has the unemployment rate been below five percent. In 1975 a record 7.83 million workers or 8.7 percent of the working population were unemployed (Ref 28:218). As a result of this high unemployment rate the President and Congress have given considerable attention to ways of lowering the unemployment rate and stimulating the economy.

One means of stimulating the economy and reducing unemployment is to increase exports. As discussed earlier in this chapter, exports are exogenous expenditures and create additional expenditures in the economy through the multiplier effect. At the same time these exports create additional employment. A number of exports with between 30,000 and 40,000 jobs. This means that the 8.2 billion dollars of foreign military sales in 1976 supported between 246,000 and 328,000 jobs in the US.

Aerospace Employment

Employment in the aerospace industry has declined considerably since its peak year in 1968. Since 1968

employment has dropped from roughly 1,500,000 to just under 900,000 in 1976. However, a 1977 Aerospace Industries Association (AIA) survey predicted that all occupational groups in the aerospace industries would experience a rise in employment in late 1977 and 1978. Aerospace employment should reach approximately 916,000 in 1977 and is expected to reach 935,000 by the end of 1978 (Ref 3:119-120). Overall aerospace employment trends can be seen in Table 3-5.

Despite recent declines in aerospace employment the aerospace industry continues to play an important role in providing jobs for US workers. The aerospace industry is one of the largest single employers of scientists and engineers employed for research and development (R&D) efforts. In 1976 67,400 scientists and engineers were employed by the aerospace industry for R&D efforts. This represented 18.6 percent of the R&D engineers and scientists in the US, but it was still below the peak level of 29.7 percent or 101,100 employees achieved in 1964. Employment statistics for scientists and engineers can be found in Table 3-6.

The aerospace industry also affects employment in other occupational areas. In 1976 not only did the aerospace industry employ 899,000 workers, but the effect of this employment was also felt in other industries associated with the aerospace industry (Ref 3:122). The Bureau of Labor Statistics specifies an employment multiplier coefficient of 1.73 for the aerospace industry (Ref 62:125). This

Table 3-5
AEROSPACE EMPLOYMENT
Calendar Years 1961 to Date
(Thousands of Employees)

Year	TOTAL	Aircraft	Missiles & Space	Communi- cations Equipment	Other
TOTAL EMPLOYMENT					
1961	1,178	610	152	160	256
1962	1,270	638	165	193	274
1963	1,267	639	173	183	272
1964	1,209	605	166	171	267
1965	1,175	624	155	145	251
1966	1,375	753	159	166	297
1967	1,484	834	157	179	314
1968	1,502	852	150	184	316
1969	1,402	804	124	179	295
1970	1,166	669	98	152	247
1971	951	531	88	129	203
1972	922	501	90	132	199
1973	948	514	95	134	205
1974	965	532	91	132	210
1975	942	514	90	136	202
1976	899	485	85	135	194
PRODUCTION WORKERS					
1961	612	348	56	75	133
1962	635	349	58	90	138
1963	625	351	55	82	137
1964	600	339	54	74	133
1965	597	356	51	62	123
1966	731	446	55	73	157
1967	804	502	55	78	169
1968	807	506	52	80	169
1969	746	464	41	86	155
1970	604	369	31	77	127
1971	480	285	26	66	103
1972	453	271	27	57	98
1973	475	281	31	59	104
1974	478	291	24	58	105
1975	455	273	25	58	99
1976	422	250	23	58	91

Source: Bureau of Labor Statistics "Employment and Earnings" (Monthly); Aerospace Industries Association estimates.

(Aerospace Facts and Figures, 1977/78 : 122)

Table 3-6

**EMPLOYMENT OF SCIENTISTS AND ENGINEERS
FOR RESEARCH AND DEVELOPMENT**

Total and Aerospace
1950 to Date

Year	TOTAL	Aerospace	Aerospace as a Percent of Total
AS OF DECEMBER 31			
1960	292,000	72,400	24.8%
1961	312,100	78,500	25.2
1962	312,000	79,400	25.4
1963	327,300	90,700	27.7
1964	340,200	101,100	29.7
1965	343,600	99,200	28.9
1966	353,200	99,300	28.1
1967	367,200	100,400	27.3
1968	376,700	101,100	26.8
1969	387,100	99,900	25.8
1970	384,100	92,600	24.1
1971	366,800	78,300	21.3
1972	349,900	71,200	20.3
1973	356,600	72,300	20.3
1974	358,200	70,800	19.8
1975 ^r	360,400	67,600	18.8
1976	362,500	67,400	18.6

Source: National Science Foundation.

NOTE: Scientists and engineers working less than full time have been included in terms of their full time equivalent number.

^r Revised.

(Aerospace Facts and Figures, 1977/78 : 129)

multiplier coefficient is derived in a manner similar to the spending coefficient discussed earlier in this chapter and works in an identical manner. Thus, for every 100 jobs in the aerospace industry an additional 73 jobs are created in supporting industries. At the 1976 aerospace employment level of 899,000 workers, that means that the aerospace industry directly and indirectly provided approximately 1,555,000 jobs in the US.

The percentage of aerospace production workers engaged in export work has increased steadily from 19 percent in 1967 to 39 percent in 1973. Corresponding to the large jump in FMS from 1973 to 1974, the percentage jumped to 50 percent and has remained at that rate through 1976. In 1977 it is estimated that 54 percent of all aerospace workers will be engaged in export work (Ref 61:184). Table 3-7 shows the potential effect of aerospace exports on US employment based on the assumption that these percentage figures for production workers engaged in export work can be applied to the total aerospace employment figures. Given the validity of this assumption and the employment multiplier effect noted above, total 1977 US employment due to FMS was estimated at 240,000.

CBO's Analysis of FMS and the US Economy

The Congressional Budget Office (CBO) performs economic analyses and evaluations of selected topics for the Congress

Table 3-7
FMS Aerospace Employment and US Employment

Year	I Aerospace Employment (Thousands)	II % of Employees ¹ Engaged in Export	III Employees ² Engaged in Export (Thousands)	IV FMS's % ³ of Export	V FMS Aero- space Employment (Thousands)	VI US Employ- ment Due to FMS (Thousands)
1970	1166	30	350	26.1	91	158
1971	951	33	314	26.7	84	145
1972	922	36	332	22.1	73	127
1973	948	39	370	26.3	97	168
1974	965	50	483	25.6	124	214
1975	942	50	471	31.7	149	258
1976	899	50	450	27.7	125	216
1977	916 ^E	54 ^E	495	28.0 ^E	139	240

Notes: 1. (US Industrial Outlook 1977:184)

2. Column I x Column II

3. Table 3-4

4. Column III x Column IV

5. Column V x 1.73 (Multiplier Coefficient)

E - Estimates

of the United States. In 1976, in response to a House Armed Services Committee request, the CBO prepared an economic analysis of the effects of changes in US policies regarding arms sales abroad. The study, entitled "The Effect of Foreign Military Sales on The US Economy," analyzed the effects of a total ban on foreign military sales on the US economy versus constant real annual sales (1976 dollars) of 8.2 billion dollars.

Economic Models

The analysis of the economic activity associated with FMS was performed using two econometric computer models. The models used in the study were the 1976 version of the Data Resource, Inc. (DRI) model and the 1975 version of the Wharton Econometric Forecasting Associates, Inc. model. These models are standard economic forecasting models and required only minor modifications to their input data to simulate the CBO estimates of actual expenditures.

Model Assumptions

The analysis of the CBO study was structured to compare projections under two alternative assumptions about the foreign military sales program. The first alternative was that foreign military sales programs would in real terms remain constant between fiscal years 1977 and 1981. This means that 8.2 billion dollars (1976 dollars) in new orders would be accepted in each fiscal year through 1981. In

addition it was assumed that the weapons would remain roughly equivalent to the mix found in the fiscal year 1976 purchases.

The second alternative was that a complete ban of FMS sales would be imposed in fiscal year 1977. Under this assumption all orders received prior to 1 October 1976 would be honored and delivered in future years as production was completed. Sales after that date would be prohibited. Alternate foreign or domestic sales were not allowed to replace the lost FMS market in this analysis.

Model Predictions

The CBO analysis is essentially a comparison of the changes in the levels of selected economic indices between the alternative assumptions. Table 3-8 shows the results of this analysis. Using the Warton model the CBO analysis predicted that a ban on foreign military sales starting in fiscal year 1977 would by fiscal year 1981 reduce the US GNP by nearly 20 billion dollars or 12.5 billion dollars in constant 1976 dollars. This reduction in the GNP is gradual, but over the five year span the total loss in GNP in constant dollars is 40.8 billion dollars (Ref 27: 22).

US employment levels would also be affected by a ban on foreign military sales. The CBO study projected that employment, mainly in the defense industries, would drop by 20,000 to 30,000 jobs in fiscal year 1977 (Ref 27:25). The reductions in defense employment were expected to increase as the previous FMS orders were completed and delivered. The CBO staff concluded that the loss of defense

Table 3-8

EFFECT OF A BAN ON FMS STARTING IN FISCAL YEAR 1977 VERSUS
A CONSTANT SALES PROGRAM IN FISCAL YEARS 1977-1981:

Changes In Levels Of Selected Indices
(Fiscal years)

	1977	1978	1979	1980	1981
Current Dollar GNP (in billions of \$)					
Wharton	-1.2	-5.7	-10.1	-14.6	-19.5
DRI	-1.4	-3.5	-9.0	-16.9	-24.1
Real GNP (in billions of FY 1976 \$)					
Wharton	-1.5	-6.2	-9.7	-10.9	-12.5
DRI	-1.2	-2.5	-6.4	-10.0	-12.1
GNP Deflator (FY 1976=100)					
Wharton	+.03	+.09	+.11	--	-.11
DRI	-.01	-.04	-.08	-.23	-.42
Unemployment Rate					
Wharton	+.03	+.14	+.25	+.32	+.35
DRI	+.02	+.05	+.10	+.17	+.21
Employment (millions)					
Wharton	-.03	-.13	-.25	-.33	-.38
DRI	-.02	-.06	-.13	-.24	-.33
Personal Income (in billions of \$)					
Wharton	-.6	-3.6	-6.2	-8.6	-11.9
DRI	-.9	-2.5	-6.0	-11.7	-17.6
Corporate Profits (in billions of \$)					
Wharton	-.4	-.8	-2.1	-3.5	-4.3
DRI	-.3	-.7	-2.2	-4.0	-5.6
4-6 Month Commercial Paper Rate					
Wharton	--	--	-.01	-.03	-.05
DRI	-.02	-.06	-.09	-.16	-.21
Exports (in billions of \$)					
Wharton	-.4	-1.2	-3.9	-7.4	-10.0
DRI	-.5	-1.5	-4.7	-9.1	-12.5
Imports (in billions of \$)					
Wharton	-.3	-1.3	-2.0	-2.6	-3.0
DRI	-.1	-.5	-1.2	-2.8	-4.5
Net Exports (in billions of \$)					
Wharton	-.1	+.1	-1.9	-4.8	-7.0
DRI	-.4	-1.0	-3.5	-6.3	-8.0

(The Effect of Foreign Military Sales on the US
Economy: 22)

employment due to a ban on all FMS sales coupled with the multiplier effect would result in the loss of 350,000 jobs and raise the US unemployment rate by .3 percent by the year 1981 (Ref 27:25).

The CBO study also addressed the effect of a ban on FMS on the US balance of trade. Like other economic indicies changes in net exports or the balance of trade are gradual, but the Wharton model predicted that by 1981 net exports were expected to be 7 billion dollars lower than they would be without the ban on foreign military sales. The difference between the 7 billion dollars in exports and the loss of 8.2 billion dollars in FMS sales is due to the reduction of imports associated with the foreign military sales and the timing of the FMS deliveries.

In short, the CBO report found that FMS has a significant effect on the US economy. Examination of the results obtained through the DRI and Wharton econometric models showed a significant effect on the US GNP, employment levels, personal income, corporate profits, and balance of trade. Although a total ban of foreign military sales is not likely, changes in foreign military sales policies can and will effect the US economy in varying degrees.

Summary

Foreign military sales have a number of significant effects on the US economy. Although foreign military sales contracts are with companies in the DIB, the effects of the

sales are felt throughout the US economy as a result of the multiplier effect. The multiplier effect theory states that an expenditure in the economy will have an impact greater than the original expenditure. In the US economy foreign military sales thus are assumed to generate additional expenditures approximately equal in value to the original sale.

The economic effects of FMS are found in the standard economic indicators such as the US gross national product (GNP), the US balance of trade, and the US unemployment rates. In 1976 foreign military sales increased the GNP by approximately 16.4 billion dollars, provided a positive trade balance of approximately 8.2 billion dollars, and were responsible for supporting from 246,000 to 328,000 jobs. In short, FMS significantly affects the US economy.

IV. FMS AND THE US GOVERNMENT

Traditionally foreign military sales have been justified on the basis of foreign policy. However, in recent years the economic consequences of significant changes in foreign military sales programs have been a major element in the annual debate over the sale of US arms abroad. The assessment of these consequences centers on two major issues: (1) the budgetary cost savings to the US which result from foreign military sales and (2) the macro-economic effects of FMS on the economy (Ref 25:IX). The effect of FMS on the US economy was the topic of a recent Congressional Budget Office study and was discussed in the previous section. Two related CBO reports, Foreign Military Sales and US Weapon Costs (May 1976) and Budgetary Cost Savings to the Department of Defense Resulting from Foreign Military Sales (May 1976), examined DOD budgetary cost savings resulting from FMS and form the primary basis for discussion in this chapter.

DOD Cost Savings

The US government performs the role of the middleman in foreign military sales. By law and policy all negotiations on FMS procurements are required to be handled as if the procurements were US procurements. As the middleman, the US Government/DOD administers the FMS procurements and

performs contract negotiations for the foreign government. However, the DOD incurs no cost burden or profit from either the foreign government or the manufacturer in performing this function.

Indirect cost savings appear, however, to exist. Ten of the 15 individuals interviewed indicated their belief that foreign military sales reduced DOD costs by sharing US development and production costs. The CBO studies indicated these savings can be substantial especially in the areas of R&D and overhead recoupment (Ref 26:VII).

The CBO study, "Budgetary Cost Savings to the Department of Defense Resulting from Foreign Military Sales", attempted to quantify the dollar value of the DOD cost savings attributable to foreign military sales. The study analysed cost data and sales predictions of 35 different foreign military sales programs. Through this analysis the study classified five major areas of DOD cost savings resulting from FMS: (1) research and development recoupments, (2) learning curve effects and economies of scale, (3) overhead, (4) production line gap, and (5) other (Ref 25:IX). The estimated cost savings in each category for seven aerospace programs can be seen in Table 4-1. The cost savings for all 35 programs can be seen in Tables 4-1a, through 4-1c, Appendix D.

Table 4-1
Estimated Total Saving and Sales FY 1972-81
(Millions of Current Dollars)

System	Total Sales	Total Savings	R&D	Learning Curve	Overhead	Production Line Gap	Other
Phoenix	193.0	32.6	15.5	5.7	1.5	0	9.9
F-14	1412.2	229.2	168.6	20.6	40.1	0	0
F-15	240.0	70.1	40.0	30.1	0	0	0
F-16	855.6	126.0	67.7	43.7	14.6	0	0
F-4E	2142.0	413.0	36.2	1.2	366.6	9.0	0
F-5E/F	1683.6	107.0	41.8	19.6	34.5	0	11.1
AWACS	3476.0	338.6	219.8	118.8	0	0	0

(Excerpts from Budgetary Cost Savings to the Department of Defense
Resulting from Foreign Military Sales: 10)

See Appendix D Tables 4-1a through 4-1c for the CBO results.

R&D Recoupments

The recoveries of research and development costs are the most direct and largest source of savings to the DOD (Ref 26:7). During the first five years of a weapon system's production, RDT&E and non-recurring production costs are prorated as cost pools against the total estimated sales projection of the weapon system (Ref 31:5). This calculation provides a dollar value for the RDT&E recoupment, which is charged as a surcharge on each individual weapon system purchased. After the fifth year of production a RDT&E surcharge is assessed in an amount not to exceed four percent of the purchase price of the FMS procurement (Ref 26:7). Under current regulations RDT&E savings thus are easily identified and are equivalent to the amount of the RDT&E surcharge added to the price of the weapon system.

Since the RDT&E surcharge is dependent on the amount of time the weapon system has been in production, R&D savings vary with each purchase. In the case of the Iranian purchase of the F-14 the savings is substantial. Iran has been the only foreign purchaser of the F-14 and its purchase of 80 F-14's occurred during the first five years of production. As a result Iran's initial prorata share of the F-14 RDT&E costs was 160.6 million dollars (Ref 26:8). Total R&D recoupments on the F-14 program are expected to reach 168.6 million dollars by 1981 (Ref 25:10). This recoupment represents roughly nine percent of the total R&D expenditures and is the largest single recoupment

in recent years. However, a similar RDT&E recoupment of 219.8 million dollars is expected on the foreign sale of the AWACS E3-A aircraft (Ref 25:IX).

Besides the timing of the FMS purchase, the type of weapon system purchased affects the amount of R&D recoupment. The recoupment of RDT&E funds appears to be the greatest on high technology items such as aircraft and missiles (Ref 26:7). Aircraft such as the F-14, F-15, F-16, and E3-A all required considerable R&D investments which have been and will continue to be directly prorated to FMS purchases. In addition, even after the initial five year production the high cost of these aircraft will enable a considerable R&D recoupment. In fact, the Congressional Budget Office is projecting RDT&E recoupments on the F-14, F-15, F-16, and E3-A to exceed 496 million dollars by fiscal year 1981 (Ref 25:X).

The cost savings generated by R&D recoupments are unique in that they reduce the annual R&D appropriations rather than reducing the actual cost of the R&D efforts. In the annual DOD budget requests each service's R&D appropriation is reduced by the expected R&D recoupments to be received that fiscal year (Ref 30:3). This procedure reduces the amount to be funded by the respective services' R&D appropriations. The rest of the annual R&D funds comes from the FMS trust fund in amounts prescribed in the FMS Letters of Offer and Acceptance (DD Form 1513). The actual

actual budget authority and disbursement of these funds is governed by this excerpt from DODI 2140.1.

Properly executed DD Forms 1513 represent contract authority to the FMS trust fund. In turn, budget authority released from the FMS trust fund represents obligation authority to the receiving/performing DOD components and shall be credited to the most current applicable appropriation used to finance the material/services sold. The value of the budget authority recognized and issued by the FMS trust fund during any fiscal year shall not exceed the value of the obligations which will be incurred by the receiving/performing DOD components against that budget authority by the end of the year. Cash reimbursements from the trust fund will be credited to the appropriation/fund in which a FMS trust fund release of budget authority created the obligation authority. (Ref 30:2)

In short, the US annual R&D efforts are partially funded by R&D recoupments from foreign military sales.

R&D funding for PEP 2000 is an excellent example of the extent to which FMS R&D recoupments provide funds for US R&D efforts. The PEP 2000 project is an external fuel tank for the F-15, which is supposed to extend the F-15's range and loiter time. In hearings before the Senate Committee on appropriations General Slay presented a total R&D cost for this project of over 37 million dollars. Over 24 million of this was, however, to be funded by F-15 FMS R&D recoupments (Ref 24:145).

In addition, there was still 12.2 million dollars in R&D recoupment from the sale of F-4D's to Korea that was available for R&D reprogramming (Ref 24:145). Thus, it appears that a major portion of the follow on R&D efforts on the

F-15 and other aircraft are being supported by FMS R&D recoupments.

On paper it appears that the US can recoup large portions of its R&D expenditures through FMS. However, this is not always the case. The majority of the interview discussions indicated that in practice the R&D surcharge is a set dollar figure which is rarely changed during the life of the program. Table 4-2 shows some of the current R&D surcharges. The first two aircraft, the F-15 and F-16, are being sold through FMS during the first five years of production and have relatively high R&D recommendations. The last three aircraft programs are older programs and have an R&D surcharge considerably less than the first two aircraft.

Table 4-2

FMS R&D Surcharges

(Millions of Dollars Per A/C)

	<u>F-15</u>	<u>F-16</u>	<u>F-5F</u>	<u>F-4E</u>	<u>C-130</u>
Surcharge	1.6	.64	.3	.12	.015

(Figures obtained in interviews with ASD personnel.)

These figures were established in the upper echelons of the Department of Defense and reflect political as well as economic factors. As a result the fixed R&D surcharge does not always recoup the total amount of R&D funds that is possible.

Other factors that reduce the value of the R&D recoupments are the time value of money and inflation. The payment of the R&D surcharge is built into the schedule of payments. This means that the R&D recoupment occurs several years after the actual expenditures and is paid in then year dollars. In the case of the F-16 the R&D surcharge was established in 1975 dollars, but the first payments will not be made until 1980 or 1981 for the first Middle East FMS aircraft. As a result, the actual value of the F-16 R&D recoupment in constant dollars will be considerably reduced by inflation and the time value of money.

Overhead

The sharing of overhead costs was mentioned in each interview as a potential source of DOD cost savings. Overhead costs are those costs which can not be directly assigned against a specific production run or job. Commonly called indirect costs, these costs are accumulated in a cost pool and are passed on to the customer in prorata shares as part of the price of the product. The portion of these costs paid by foreign customers which would have otherwise been paid by the US government is overhead savings generated by foreign military sales (Ref 25:IV).

Unfortunately the measurement of overhead cost savings is complicated by the requirement to distinguish

between fixed and variable overhead costs. Overhead cost savings are realized on the fixed portion of overhead costs. Fixed overhead costs are those overhead costs which remain relatively insensitive to changes in production or sales. Variable overhead costs occur with the production of each unit, but do not generate cost savings since the costs would not have been incurred if there had not been a foreign military sales order.

Like R&D recoupments overhead savings vary substantially according to the size and timing of the FMS orders, but the timing consideration is different for overhead savings (Ref 26:9). The production of US and FMS orders must occur in the same accounting period for any overhead cost savings to occur. However, the production of US and FMS orders need not be on the same product for these savings to occur.

An excellent example of overhead savings occurred with the production of the F-4E. In 1974 the MAC AIR Division of McDonnell Douglas shifted from program overhead rates to plant overhead rates in a effort to hold down costs on the F-15. This move raised the unit price of the F-4E and at the same time prevented an excessive cost overrun on the F-15 program (Interviews). In effect this shifted the overhead burden to the F-4 and the foreign customer. The savings to the DOD are expected to reach 366 million by fiscal year 1981 since all sales of the F-4E have been to foreign customers since 1972. However, these savings

can only be considered if the F-4E production line would have remained open without the FMS orders.

Tax Recoupments

In addition to reducing defense appropriation requirements, FMS procurements generate a significant cash flow into the United States treasury in the form of tax revenues. These taxes are generated by taxing the profits and personal income created by the purchase of US weapon systems and the resulting multiplier effects. While this recoupment is not directly credited with reducing the cost of DOD procurements, it does provide the US treasury with a substantial increase in tax revenues. Table 4-3 shows the extent that tax revenues resulting from foreign sales of the F-15 would, if applied to the F-15 program, reduce the cost of the US purchases of the F-15.

One estimate of the value of the cash flow to the US treasury has been made by the Wharton Econometric Model. This model has predicted that 65 percent of the value of the equipment produced in the United States for sale to foreign customers will eventually flow into the US treasury in the form of tax receipts (Ref 48:20). In view of the multiplier effect doctrine this figure appears to be reasonable. A multiplier coefficient of two and an average tax rate of 32.5 percent will generate a tax recoupment equal to 65 percent of the original expenditure. Different multiplier coefficients and tax rates can also obtain the same results.

Table 4-3

F-15 Tax Recoupments Applied to
the F-15 Program Office

(Millions of Dollars)

Program Value of U.S. F-15 Program	\$9274
Average Unit Cost of U.S. Program (749 Aircraft)	12.38
Program Value of Foreign F-15 Programs	6950
Dollar Flow to the U.S. from the Foreign F-15 Programs	5490
Tax Recoupment Dollars to the U.S. Treasury (65 percent Recoupment Rate)	3568
Net Cost of the F-15 to the U.S. Government (9274 - 3568)	5706
Net Average Unit Cost of the U.S. F-15's	7.62

(Adapted from Economics of Military Export Sales: 23)

through FMS. These sales will in turn generate a total of 5490 million dollars worth of purchases from US industries (Ref 48:25). At a 65 percent tax recoupment rate that means the F-15 program will result in the recoupment of 3568 million dollars in tax revenues for the US government. Similar recoupments are to be found in the sales of the F-5, F-4, and F-14 FMS programs. Tax recoupments from these programs can be seen in Table 4-4.

Table 4-4

	US Tax Recoupments (Millions of Dollars)				
	<u>F-5A/B</u>	<u>F-5E</u>	<u>F-4E</u>	<u>F-14</u>	<u>F-15</u>
Recoupments	215	267 ¹	3122	1300 ¹	3568 ¹
Through	Completed	1977	1974	1978	1981

1. Estimated

(Adapted from Chapter III Economics of Military Exports Sales).

In short, tax revenues attributable to FMS are significant. They are hidden, however, in general revenues and are not credited to each weapon systems procurement costs.

Learning Curves

Learning curve theory assumes that as workers learn an operation their efficiency improves and the direct labor cost per unit decreases. This phenomenon prevails in many industries and its existence has been verified by empirical data and controlled tests. In fact, the aerospace industry

has been using learning curves for years to predict reductions in costs as the number of consecutive items produced increased.

The basis of learning curve theory is that each time the total quantity of items produced doubles, the unit cost per item is reduced by a constant percentage of its previous cost. As an example, assume the production of a modern fighter uses a learning factor of approximately .95. This means that the direct labor cost to produce the 100th unit will be approximately 95 percent of the direct labor costs incurred to produce the 50th unit. This process continues as the cumulative number of aircraft produced increases, but most of the cost reductions or potential cost savings occur during the first 50 to 100 units produced.

Because learning curve cost savings occur early in production runs, Department of Defense learning curve cost savings attributable to foreign military sales are dependent on the timing of the FMS procurement. Since in most procurements US orders are filled prior to FMS orders, little, if any, cost savings are generated by foreign military sales. However, in programs such as the AWACS where FMS deliveries occur very early in the production (before the 100th aircraft) savings can be substantial. The CBO studies estimated learning curve savings on the AWACS will reach 118.8 million dollars by 1981 (Ref 25:X).

Production Line Gap

Production line gap occurs when a firm encounters an absence of firm commitments to purchase its products. In this situation it is often more advantageous to the firm to shut down its production line rather than keep it open. However, the closing and subsequent reopening of a production line generates certain additional costs which are passed on to the company's customers. When the DOD or other customers can avoid paying a portion or all of these additional costs, production line gap savings occur.

In certain instances foreign military sales have filled the gap between US procurements. The C-130 is an excellent example of this situation. The C-130 production line produces 36 aircraft a year, but in fiscal year 1977 only six of the aircraft were purchased by the US government. The government personnel interviewed contended that this purchase and prior year purchases were not large enough to justify keeping the production line open without the help of foreign purchases. In other words, the government has been saved the additional expense of closing and reopening the production line in order to fulfill its own procurements of the C-130.

Other

"Other" is a general category for other types of cost savings. The costs in this category are normally nonrecurring costs that the US government is able to share with the foreign customers of the product (Ref 25:V). As an example, a prorata share of nonrecurring production costs such as tooling on new production lines is charged to the foreign customers and is credited to the appropriate procurement appropriation (Ref 30:3). However, these cost savings are generally small in comparison to overhead and R&D recoupments.

The FMS Sales Mix and Savings

The amount of cost savings from foreign military sales is largely dependent on the type of weapon system being sold. Certain types of foreign military sales such as aircraft, missiles, vehicles, weapons, and communications equipment all have the potential to generate significant cost savings (Ref 25: 13-14). However, sales of ships, ammunition, construction packages, maintenance and supply services, training, and other services have historically generated little if any cost savings. Table 4-5 contains recent FMS sales mixes for these categories and shows that in fiscal years 1972 through 1974 66 to 77 percent of the foreign military sales in those years were in the high cost savings categories. In 1975 the percentage of the sales in the high cost savings categories dropped to 51

Table 4-5

Foreign Military Sales By Sales Category
(Fiscal Years)

<u>Category</u>	<u>Percent of Annual Sales</u>			
	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>
Aircraft	53	53	45	27
Missiles	6	18	7	14
Vehicles & Weapons	9	13	12	7
Communications Equipment	<u>3</u>	<u>3</u>	<u>4</u>	<u>7</u>
Subtotal	71	77	66	51
Ships	2	2	12	15
Other Equipment	<u>5</u>	<u>3</u>	<u>4</u>	<u>7</u>
Subtotal	7	5	16	22
Ammunition	6	5	5	10
Construction	0	0	0	1
Repair & Maintenance	4	1	0	2
Supply Operations	3	3	4	4
Training	4	4	2	3
Other Services	<u>7</u>	<u>5</u>	<u>6</u>	<u>9</u>
Subtotal	24	17	17	29

(Adapted from Budgetary Cost Savings to the Department of Defense Resulting from Foreign Military Sales: 16)

Note: Totals may not add do to rounding.

percent. In the CBO study data from the 35 weapon systems previously mentioned were analyzed in order to estimate an average total savings per dollar of foreign military sales. Assuming a sales mix in which 50 percent of the sales were capable of producing cost savings the analysis yielded an average total savings of .07 dollars per dollar of foreign military sales (Ref 25: 22). Government R&D recoupments accounted for .02 dollars of that savings figure. When 70 percent of the sales were capable of producing savings, the savings figures jumped to .10 and .03 dollars per dollar of FMS respectively.

Summary

Foreign military sales have traditionally been justified on the basis of foreign policy. However, in recent years US government/DOD cost savings have provided economic justification for foreign military sales. Although the cost savings attributable to FMS are not easily measured, they have been addressed in two Congressional Budget Office studies. It appears that the major US government/DOD cost savings resulting from FMS occur through R&D, overhead, and tax recoupments. Additional savings are also possible as a result of learning curve effects and a reduction in production line gaps. FMS generates cost savings in each of the areas mentioned above, but the actual amount of the savings is dependent on the size, timing, and type of the FMS procurement.

V. FMS AND THE DIB

From 1970 to 1974 DIB defense sales as a percentage of total sales of the DIB declined from 19.8 percent to 11.8 percent (Ref 15:43). This drop is indicative of the reduction in the amount of defense business accomplished by all segments of the DIB.

Commercially oriented companies in the DIB (approximately 45 percent of the companies in the DIB) account for approximately 50 percent of all defense hardware procurements. Perceived difficulties in doing business with the DOD have, however, caused commercially oriented companies in the DIB to reduce their volume of defense business. As a result the percentage of defense sales of the DIB's commercially oriented companies relative to their total sales has declined from 9.5 percent in 1970 to 4.8 percent in 1974 (Ref 15:43). In addition, since these companies generally regard defense orders as a supplement to their primary business, it seems unlikely that they will significantly adjust their business strategies to respond to future changes in defense procurement requirements and regulations (Ref 14:4).

Companies with a high defense orientation (approximately 22 percent of the companies in the DIB) in general do not have contracts (Ref 14:4). The percentage of defense sales relative to total sales of the DIB's high defense oriented companies has declined from 83.8 percent in 1970 to 78.1 percent in 1974 (Ref 15:43). As a result these companies are still heavily dependent on defense customers for their business (Ref 14:4).

The DIB companies with a moderate defense orientation are somewhat less dependent on defense contracts for their business than the highly defense oriented companies. Companies with a moderate defense orientation depend on defense sales for between 15 and 45 percent of their business. However, like the highly defense oriented companies their ability to change to commercial contracts is somewhat limited (Ref 14:5). As a result it appears that both the high and moderately defense oriented companies in the DIB (approximately 55 percent of the DIB) are to varying degrees dependent on defense contracts and responsive to changes in DOD policies and regulations.

Foreign military sales represent a growing portion of the DIB's defense business. Between 1970 and 1975 the DIB's exports of military goods and services grew from 9 to 49 percent of the DIB's military procurements (Ref 15:33). During the same time period FMS's share of these exports grew from 52 to 89 percent. As a result there are some sectors of the DIB which have become economically dependent on FMS.

Economic dependency on FMS refers to the extent which foreign military sales affect the management of industries in the DIB. The most visible affect of foreign military sales is an increase in sales, but an increase in sales also influences decisions on investments, resource usage, employment policies, and product selection. In turn these

decisions impact other managerial decisions at all levels of management within an industry. Foreign military sales have grown to the point where FMS is an important consideration in the management of many corporations within the DIB.

The effects of the growth in foreign military sales have been magnified by the decline in domestic military procurements. Table 5-1 shows a gradual decline in domestic procurements through 1976, with a sudden upturn in 1977. However, in constant dollars the decline has continued. In constant 1967 dollars domestic military procurements have declined from 25.8 billion dollars in 1967 to 14.0 billion dollars in 1977; a drop of 46 percent (Ref 15:33-39).

Table 5-1 also shows the rapid growth of foreign military procurements. In current dollars foreign military procurements have grown from 1.952 billion dollars in 1967 to 6.9 billion dollars in 1977; a growth of 350 percent. In constant dollars the growth is less dramatic. In constant 1967 dollars foreign military procurements grew from 1.952 to 3.3 billion dollars; a growth of only 169 percent. Although FMS has not completely offset the decline in domestic military procurements, it has become a larger portion of the DIB's business and has exerted a greater influence on the DIB.

Aerospace Economic Dependency

The aerospace industry (aircraft and missiles) is dependent on exports for a significant portion of its military procurement contracts. As can be seen in Table 5-1, from

Table 5-1

TOTAL MILITARY PROCUREMENTS
(Millions of Current Dollars)

Fiscal Year	Market	Aircraft	Missiles	Ships	Vehicles & Weapons	Ammunition	Electronics	Total
1967	Domestic	9,677	4,333	2,048	2,055	3,554	4,160	25,827
	Foreign	819	145	333	327	171	157	1,952
	Total	10,496	4,478	2,381	2,382	3,725	4,317	27,779
1968	Domestic	9,470	4,732	1,943	2,095	4,513	3,727	26,480
	Foreign	740	205	39	311	188	157	1,641
	Total	10,210	4,937	1,982	2,406	4,701	3,884	28,121
1969	Domestic	8,317	5,239	1,457	1,601	4,852	3,762	25,227
	Foreign	1,257	373	38	287	158	140	2,253
	Total	9,574	5,612	1,495	1,888	5,010	3,902	27,480
1970	Domestic	6,596	4,785	1,629	1,314	3,020	3,160	20,504
	Foreign	703	172	111	245	203	313	1,747
	Total	7,299	4,957	1,740	1,559	3,223	3,473	22,251
1971	Domestic	6,896	4,454	2,495	1,134	2,143	3,061	20,185
	Foreign	1,573	219	96	456	307	186	2,836
	Total	8,469	4,673	2,591	1,590	2,450	3,247	23,021
1972	Domestic	7,551	4,973	2,277	1,001	2,583	3,700	22,085
	Foreign	2,696	315	107	546	374	181	4,219
	Total	10,247	5,288	2,384	1,547	2,957	3,881	26,304
1973	Domestic	6,140	4,429	2,115	978	2,247	3,539	19,447
	Foreign	2,910	940	112	229	346	185	4,721
	Total	9,040	5,369	2,227	1,207	2,593	3,724	24,168
1974	Domestic	6,481	4,226	3,704	1,117	1,535	3,697	20,760
	Foreign	5,065	838	1,244	1,678	1,004	365	10,194
	Total	11,546	5,064	4,948	2,795	2,539	4,062	30,954
1975	Domestic	6,700	4,595	3,536	1,387	1,294	4,671	22,184
	Foreign	3,766	1,917	2,092	1,022	1,508	319	10,625
	Total	10,466	6,512	5,628	2,409	2,802	4,990	32,809
1976	Domestic	8,451	3,667	4,561	1,606	1,587	1,562	21,434
	Foreign							8,200
	Total							29,634
1977	Domestic	1,804	728	645	329	297	353	4,156
	Foreign							2,000
	Total							6,156
1977	Domestic	11,226	4,675	7,110	1,723	2,318	2,248	29,310
	Foreign							6,900
	Total							36,210

(The Defense Industrial Base: 33)

1967 through 1970 aerospace military exports held relatively constant. However, from 1971 through 1975 aerospace military exports grew from 13.6 to 33.4 percent of the total aerospace military procurements. FMS has accounted for a large portion of this increase. In 1975 FMS accounted for nearly 90 percent of the aerospace industry's military exports (Ref 15:35).

As a result of the increase in FMS as a percentage of total aerospace military procurements, some aerospace companies have become economically dependent on foreign military sales. The dependency varies with the commercial/military orientation of the company and the current sales of the products the company produces. As an example, Boeing sells a large number of commercial transports and has very little dependency on FMS. However, in the case of companies like Northrop, Lockheed, and McDonnell Douglas which are marketing military aircraft the economic dependency on FMS ranges from strong to moderate.

Northrop, one of the largest foreign military sales contractors, to a great extent develops and builds aircraft for the foreign military sales market. In 1976 Northrop received 1.3 billion dollars for sales of the F-5 and related equipment; a total equivalent to 87 percent of its military contracts for that year (Ref 33:60). In addition, Northrop's foreign military sales are expected to grow with the sale of the newly developed RF-5, projected sales of the F18, and the continued sale of the F-5 (Ref 1:28).

The Lockheed Corporation is an example where FMS has played a vital role in the survival of a company. In recent years FMS and US procurements of the C-130 have produced the bulk of Lockheed's revenues ((Ref 17:28). Had it not been for the foreign military sales of the C-130 and other US military contracts such as the C-5, TR-1, and the Trident missile, Lockheed would have had difficulty weathering its losses incurred on the production of the L-1011 (Ref 38:23).

McDonnell Douglas' economic dependence on FMS is probably best classified as moderate. McDonnell Douglas has traditionally built military aircraft for sale to the Department of Defense. The production of the F-4 and the F-15 are excellent examples of this philosophy. However, sales of the F-4 have continued even though the last US procurement was in 1972. To date roughly 50 percent of the F-4's produced 2500 have been sold to foreign customers or roughly 50 percent of the total production. Similar projections are being made for the sale of the F-15, with a US procurement of 749 aircraft and a foreign procurement of 695 aircraft. As a result McDonnell Douglas' economic dependency on FMS will probably continue to be moderate. However, like other aerospace companies, the degree of economic dependency will vary depending on the availability of domestic sales, the company's financial condition, and the type of product the company chooses to produce.

Research and Development Funding

The aerospace industry has traditionally been a vital source of high technology products. In recent years the industry's sale of these products has expanded through extensive sales efforts both domestic and abroad. However, maintaining dominance in these markets has forced the aerospace industry to maintain a high level of R&D efforts. As a result the aerospace industry now supports approximately 30 percent of all industrial R&D performed in the United States (Ref 3:94). These aerospace R&D efforts account for nearly 20 percent of the industry's annual revenues (Ref 4:53).

Aerospace R&D efforts are predominately financed by US government R&D appropriations and FMS R&D recoupments. The industry is the number one recipient of government R&D contracts and receives over half of the government funds contracted for industrial R&D (Ref 4:53). In fiscal year 1975 federal funding accounted for 4.5 billion dollars or over 80 percent of the aerospace industry's R&D funding (Ref 3:59). Table 5-2 shows the share of aerospace R&D efforts funded by company and federal funds. Included in the federal funds are the R&D recoupments discussed in Chapter IV.

The industry funded portion of the R&D programs is also dependent on FMS, but in a more indirect manner. Industry R&D efforts are financed by profits from past sales of the industry's products. In the case of the aerospace industry

Table 5-2

**INDUSTRIAL RESEARCH AND DEVELOPMENT
ALL INDUSTRIES AND THE AEROSPACE INDUSTRY**

Calendar Years 1960 to Date
(Millions of Dollars)

Year	All Industries	Aerospace ^a Industry		
	TOTAL	TOTAL	Federal Government Funds	Company Funds
1960	\$ 10,509	\$ 3,514	\$ 3,150	\$ 364
1961	10,908	3,829	3,438	392
1962	11,464	4,042	3,588	454
1963	12,630	4,712	4,261	452
1964	13,512	5,078	4,621	457
1965	14,185	5,148	4,499	649
1966	15,548	5,526	4,724	802
1967	16,385	5,669	4,531	1,138
1968	17,429	5,776	4,544	1,232
1969	18,308	5,909	4,554	1,355
1970	18,062	5,245	4,032	1,213
1971	18,311	4,912	3,900	1,012
1972	19,383	4,992	4,043	948
1973	20,921	5,084	3,995	1,089
1974 ^r	22,399	5,318	4,140	1,177
1975	23,535	5,724	4,527	1,198

Source: National Science Foundation.

^a Includes companies primarily engaged in the manufacture of aircraft and parts, SIC Code 372, and the manufacture of ordnance and accessories, including complete guided missiles and space vehicles, SIC Code 19.

^r Revised.

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(Aerospace Facts and Figures, 1977/78 : 95)

dependent on the volume of foreign military sales and other exports.

Other Effects

Increased sales and R&D recoupments are highly visible effects of FMS on the DIB. There are, however, numerous other effects caused by foreign military sales. Increased sales generally mean more profits for the companies receiving the sales. More profits can lead to industry expansion and investment. Even without new investments or expansion the increase in sales and resultant higher production can have a direct effect on the industry's plant and equipment utilization rates. The higher production rates can also affect the employment levels in the industry. In effect FMS affects the DIB in a number of interrelated ways which in turn influence a multitude of decisions and people within the DIB.

Production Capacity

The production capacity of the DIB is one area which can be greatly affected by FMS. Between 1967 and 1974 US manufacturers of aircraft, missiles, and electronic equipment maintained a 61 to 62 percent utilization rate for their plant and equipment (Ref 15:83). This means that these industries were supporting an excess production capacity of 38 to 39 percent during this time period. However, the recent growth in foreign military sales has provided these industries with an opportunity to use their excess

production capacity. This in turn can reduce the overhead rates discussed in Chapter IV and lower the cost of these industries' products.

In the absence of foreign military sales the DIB's options for the use of its excess capacity are limited. The DIB can continue to support its excess capacity to produce military goods, but this option is not very profitable. The other option is to convert the excess capacity into the production of civilian goods. This option is more profitable, but not always possible in heavy defense oriented companies (Ref 15:5). In addition, there is also a considerable DOD concern about possible conversion of any defense production capabilities since this conversion would constitute further erosion of the DIB.

Investments

Investment in the DIB is also affected by FMS. Low profit levels and the instability of US and FMS defense markets have made investment in defense industries somewhat risky. In a LMI survey of DIB companies 70 percent of the companies expressed a greater willingness to invest in commercial business than in defense business. Less than two percent preferred to invest in defense business (Ref 15:79). However, the instability of FMS markets has not prevented some companies from investing based on projected sales in foreign markets.

Companies such as Northrop and Lockheed have invested considerable funds in competing for FMS contracts. Northrop produces the F-5 for FMS in facilities almost entirely owned by the company and has financed the development of the RF-5. Lockheed produces the C-130 in government owned facilities, but in recent years has financed continuous production with company funds on the basis of projected foreign sales and without the benefits of progress payments. An example is last year's sale of C-130's to Sudan. The contracts were signed in November and the first aircraft were delivered in February. The fact that Lockheed funded the production without a contract enabled delivery over a year faster than if production had started with the signing of the contracts. In each case Northrop and Lockheed took a risk, but the benefits from the foreign military sales outweighed the risks or the investments probably would not have been made.

Employment

As discussed in Chapter III, foreign military sales contribute to employment in all sectors of the economy. FMS also directly affects the employment in the DIB. Properly timed foreign military sales can extend production runs and fill the gap between US procurements. This allows the labor force to remain relatively constant and avoids the cost associated with cyclic layoffs of workers. In fact, the government personnel interviewed indicated that McDonnell Douglas and other aerospace companies have gone to

considerable efforts to time FMS contracts so as to avoid changes in the production rates and employment levels.

FMS Risks

The DIB is to some extent dependent on foreign military sales for additional sales, R&D funding, investment recoupments, a stable work force, and facilities utilization. However, this economic dependency on FMS does impose certain additional risks on the DIB. In the opinion of 11 of the 15 individuals interviewed, foreign military sales represent a greater economic risk to the contractor than US defense contracts or commercial sales. These individuals felt that the additional FMS risks came from the influence of the US government on the FMS market, the influence of the US government on the FMS market, the reduced reliability of cost estimates over extended lead times, and the legitimate marketing expenses which are not allowed under the present FMS pricing regulations.

The other four individuals took an opposite view and implied that the government's role as a middleman actually reduced the economic risks of the contractors for foreign military sales. They stated that they knew of no signed FMS contracts that had ever been terminated and that the payment for the contractor's affects were collected and paid by the US government. In addition, they felt that the government's influence on the market reduces any contractual problems the contractor might normally expect

to have with a foreign commercial sale.

Government Influence

One reason for additional risks on foreign military sales is the extent which the US government dominates and controls FMS. Both the President and Congress exercise considerable control over FMS. Their control has increased in recent years. As a result a significant portion of the DIB's business is regulated and controlled by the US government.

There are several reasons why government controls on foreign military sales can create additional risks for the contractors. Despite the fact that none of the individuals interviewed knew of any FMS contract termination, there is an increased possibility of contract termination with FMS contracts. In effect there are two different parties which can terminate an FMS contract, the foreign government and the US government. Since foreign military sales are an instrument of US foreign policy, actions by a foreign government contrary to US foreign policy can lead to the cancellation of the contract by the US government if the sale is no longer in the interests of the United States. This situation does not occur on domestic procurements.

The costs associated with contract terminations are usually covered by a termination clause in the contract. This clause provides a compensatory payment to the contractor for the loss of the contract. However, the payment is

generally less than what the contract would have received had the contract been completed. Since the possibility of contract termination is greater on FMS contracts than on domestic contracts, the possibility of this loss is an additional risk which a contractor takes by taking a foreign military sales contract.

A second reason why government controls on FMS can cause additional FMS risks is the government's influence over the FMS market. All foreign military sales exceeding 25 million dollars in value must be approved by Congress. As a result there is an element of risk associated with the probability that a given sale will be approved. If the sales are not approved, the contractor is subject to the loss of precontract award costs expended in furthering the sales and any potential business lost while pursuing the FMS contract.

A third risk associated with government controls is that of allowable/unallowable cost. Defense Procurement Circular 764 initiates an effort to recognize the legitimate cost of doing business with foreign governments. However, in the opinion of most of the government personnel interviewed, the Armed Services Procurement Regulation (ASPR) was written for US defense contracts and does not adequately address or recognize the costs associated with foreign military sales. As a result the contractors are not compensated for many of the costs associated with doing business in foreign countries.

When contractors do business with foreign governments, they are subject to different laws, regulations, and customs. As a result additional costs above and beyond normal US defense contract costs, such as agents fees and advertising, may be incurred. These costs are disallowed on US defense contracts and are only partially allowed on FMS contracts. This disallowance represents an element of cost risk since many of the costs expended were required in order to obtain the contract.

Long Lead Time Cost Estimates

The sales of products with long R&D and production phases tend to induce risks associated with cost estimates. Cost estimates on long lead time products are usually less accurate than shorter term estimates because of the uncertainties about future inflation rates, labor costs, technological difficulties, and other factors which affect the price of the product. As a result a firm takes a risk whenever it makes a cost estimate for a long lead time procurement. This risk is influenced by the type of contract, with the greatest risks occurring on firm fixed price contracts.

Long lead time cost estimation risks exist on US defense contracts, but the risks are compounded on foreign military sales. The processing of the Letter of Offer/Acceptance (LOA) often takes from six months to a year. This delay extends the time period between the cost estimate and actual production, thus increasing the uncertainty of

the cost estimate and decreasing the company's ability to produce the product at the estimated price.

Summary

Some companies in the DIB have developed an economic dependency on foreign military sales. Declines in the real value of DOD contracts have forced the contractors to look for additional business. Some contractors have taken on new commercial contracts, but a significant portion of the decline has been offset by an increase in FMS contracts. As a result most defense contractors have continued to produce military products, but have shifted some of their dependency from US government contracts to FMS contracts.

Foreign military sales affect both private and DOD R&D funding. In the aerospace industry FMS effects on R&D funding are especially critical since the federal government funds over 80 percent of the industry's industrial R&D efforts and the industry's future sales, both FMS and DOD, depend on these efforts.

Implicitly FMS also affects DIB resource utilization, employment, and investment policies. Foreign military sales have enabled some companies to increase their equipment utilization rates and to maintain a relatively stable employment base. In addition, the volume and value of FMS procurements can to some extent affect company investment decisions.

Foreign military sales essentially differ from domestic defense contracts in that they also have additional economic risks not found on normal US defense contracts. Government controls on FMS directly affect the FMS market and the allowability of costs associated with the FMS sales. In addition, the extra time required for the processing of FMS proposal and contracts increases the risks associated with the cost estimates on the FMS contracts.

VI. FMS POLICY CHANGES

Changes in foreign military sales policies reflect changing political and economic conditions. When the political and economic environment changes, the criteria by which previous FMS policies were measured are sometimes no longer valid. As a result new policies are adopted based on new criteria which are often very different from the previous criteria. In other words, in a changing political and economic environment policy changes are expected and inevitable. However, the effects of the changes are not always what was expected or intended.

Several recently enacted or proposed FMS policy changes have a potential economic impact on the aerospace industry/DIB. These changes include the deletion of the FMS profit factor and President Carter's 19 May 1977 proposals for reducing US involvement in foreign military sales.

All of these proposals are recent, however, and therefore little empirical evidence is available for measuring their economic effects. An attempt to measure the economic effects of these proposals was made by interviewing people knowledgeable in the field of FMS. Opinions about the potential economic effects of these changes on the aerospace industry were asked for in interviews with government personnel associated with the aerospace industry and foreign military sales. The opinions expressed in this chapter are the writer's interpretation of the interview

responses unless otherwise indicated.

The FMS Profit Factor

The weighted guidelines method is used by the government to establish the government's profit objective for defense contracts. The value of the profit objective is determined by adding the profits awarded for contractor effort, risks, facilities investment, and special profit factors. One of the special profit factors was a one to four percent (of estimated total cost) profit factor for foreign military sales contracts.

Originally the one to four percent profit factor for FMS in the weighted guidelines profit formula was intended to compensate for additional risks incurred by companies participating in foreign military sales. These risks are not the same risks compensated for by the contractor risk profit factor. Armed Service Procurement Regulation (ASPR) 3-808.5(c) recognizes normal contract risk through the contractor risk profit factor. The FMS profit factor was intended to compensate the contractor for risks such as those discussed in Chapter V.

Another reason often given for having the FMS profit factor was to encourage companies to participate in foreign military sales. This reasoning was consistent with the Nixon Doctrine of the early 1970's and was not inconsistent with the ASPR regulations. By providing a FMS profit factor to compensate for the additional risks associated with FMS,

the profit factor implicitly encouraged participation in foreign military sales.

Deletion of the FMS Profit Factor

The FMS profit factor was deleted from the weighted guidelines profit formula by a DOD message in March of 1977 but the reason for the deletion was not given in the message. The thesis interviews yielded three different opinions as to the reason for the FMS profit factor deletion.

The reason given in the majority of the interviews for the deletion of the FMS profit factor was to reduce US contractor participation in FMS. However, none of the nine individuals giving this reason felt that it was a very effective way to reduce foreign military sales. Foreign military sales represent a substantial portion of the DIB business. As a result the reduction in FMS profits has not been enough to offset the effects of the volume of FMS on the DIB's business and contractor participation in foreign military sales has not declined.

A second reason given for the deletion of the FMS profit factor was as a punishment for financial improprieties such as the bribing of foreign officials. However, this view was not widely accepted and was given in only 2 of the 15 interviews. The other 13 individuals felt that since the deletion affected all contractors and all contractors were not involved with financial improprieties, the deletion was not a form of punishment to the contractors.

A third reason given for the deletion of the FMS profit factor was that there was no justification for any additional profits on FMS contracts. Only 3 of the 15 people interviewed specifically mentioned this reason. However, several others during the course of the interviews alluded to the difficulties of justifying the increment of the FMS profit factor awarded. Although the ASPR authorized the FMS profit factor to compensate for FMS risks and specified reasons for justifying the profit level awarded, these individuals felt that the FMS profit factor was indiscriminately being given at the four percent level without considering the actual risks the contractors took in fulfilling their FMS contracts. In short, some companies received the full four percent FMS profit factor without taking enough risks to justify the level of the profit awarded.

Effects of the Deletion

In response to the question "has the deletion of the one to four percent profit factor accomplished its purpose?" only two of the 15 government personnel interviewed answered "yes". These two felt that the FMS profit factor deletion was punishing the contractors. In addition, they felt that the reduction in profits would reduce the amount of money available for future financial improprieties. However, there was little support for this line of reasoning among the other government personnel interviewed.

All nine of the interviewees who believed that the deletion of the FMS profit factor was an attempt to discourage contractor participation in foreign military sales felt that the deletion had not accomplished this purpose. One reason for this belief was that the deletion message essentially contradicted the assumed purpose of the deletion. The message deleting the FMS profit factor instructed the contract negotiators to give due consideration to additional cost and risks of foreign military sales in establishing the weighted guidelines profit objective. As a result some of the contracting officials have tried to compensate for the loss of the FMS profit factor by allowing certain costs which otherwise might not be allowed and awarding higher profits on the other profit categories. However, none of the interviewees felt that the total loss of the FMS profit factor could be offset in this manner.

The individuals who believed that the level of the FMS profit factor being awarded was usually not justified also felt that the deletion of the profit factor had not solved the problem of determining the level of profit appropriate for a given level of contractor risks and efforts. They felt that the additional risks of FMS discussed in Chapter V were still present and that the profit factor was justified and needed to compensate the contractors for the additional risks taken. In their opinion the problem of justifying a FMS profit level was not solved; it was just avoided.

The responses to the question concerning the contractors' opinions about the FMS profit factor deletion indicated that the defense contractors were very vocal about the profit factor deletion. In the contractors' opinion the deletion of the FMS profit factor was not justified. In addition, the contractors were dissatisfied with DOD efforts to offset the deletion of the FMS profit factor. In the opinion of the Council of Defense and Space Industry Association (CODSIA) the DOD's efforts to offset the adverse effects of the FMS profit factor deletion were sincere, but would fall short of providing an offset sufficient to permit pricing which adequately recognizes the special risks and cost factors involved in foreign military sales (Ref 34: A-5).

Since the deletion of the FMS profit factor, the final negotiated profit rate on aerospace FMS contracts has been two to three percentage points lower despite some efforts to increase profits on other cost categories. Even though persons interviewed would not specify the effects of the FMS profit deletion on specific companies, most felt that the reduction in profits would to some extent affect most company decisions. The aerospace corporate decisions most frequently mentioned as possibly being affected by reduced profits were R&D funding and capital investment. However, the interviewee's comments also indicated a belief that aerospace contractors were so heavily dependent on FMS that they would continue to pursue FMS contracts despite the reduction in profits.

FMS Annual Ceiling

The placement of an annual ceiling on the value of foreign military sales was one of President Carter's proposals for reducing the US's role in the world arms market. The initial reaction to the President's proposal was a strong prediction that there would be a drastic cutback in the DIB's business (Ref 20:34). This prediction was based on a presidential cancellation of four billion dollars in pending sales as well as the cancellation of the foreign military sales of 240 F-18's to Iran. However, the interview discussions indicated that with the possible exception of the F-18 sale to Iran, most of the sales reductions have not materialized and the ceiling has had little, if any, effect on the US's role as a worlds arms merchant.

There are several reasons why the annual ceiling on the value of FMS shipments has had little effect on reducing foreign military sales. The cancellation of large numbers of FMS sales could have seriously dampened the US economy and speeded the erosion of the DIB. Defense industry lobbyists and other proponents of FMS expressed this opinion to Congress and in the news media. As a result there are several loopholes in the FMS policies which effectively negate the effects of the FMS ceiling.

The largest loophole is the exclusion from the ceiling of the NATO allies, Australia, New Zealand, Japan, and Israel. Sales to these countries and certain types of sales such as construction to all countries are not counted against the FMS

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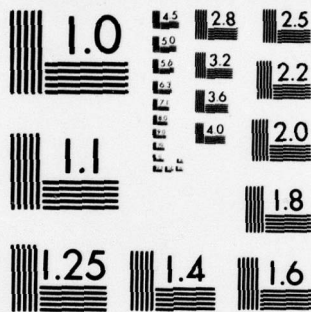
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ceiling. As a result the FMS ceiling essentially only limit the annual sales of arms to the Middle East and third world countries. However, different interpretations of circumstances surrounding sales to these countries can circumvent the ceiling.

An excellent example of interpreting the circumstances surrounding a sale is the sale of 70 F-15's to Saudi Arabia. The Saudi Arabian buy was presented as one sale, but the sale was placed on three different LOA's. One might argue that this division of the sale reflects the requirements for three different years, but many of the program purchases and cost projections are based on the total sale. In the opinion of the individuals associated with this sale, the sale is essentially one sale despite being on three different LOA's. The 1978 sale of F-5's to Egypt was also handled in this manner. Placing an order on multiple LOA's may reflect the requirements for different years, but it also avoids the FMS ceiling in the initial year.

R&D for FMS

A second proposal by President Carter for controlling FMS was to restrict the sales of military products developed solely for export. In the aerospace industry this policy most visibly affects Northrop. Northrop developed the F-5 solely for FMS and has since developed an RF-5 for foreign customers. In the opinion of the interviewed government personnel associated with Northrop, a loss of these sales could

financially hurt Northrop. However, these individuals did not know to what extent this policy would be enforced or if it would apply to Northrop, since Northrop had encountered very few restrictions for the marketing of new RF-5. In short, it is too early to tell how the restriction on R&D for FMS will be enforced or the potential effect on defense contractors.

Modifications for FMS

President Carter's proposal to ban FMS modifications to improve advanced weapon systems is similar to his R&D proposal. However, the potential effects of this proposal appear to be far more extensive than the R&D proposal. Northrop performs a considerable amount of modification work on its products for foreign customers. Companies such as McDonnell Douglas and Lockheed also accept foreign contracts to modify their products. As an example, McDonnell Douglas has contracted to modify the Japanese F-15 under a 20 million dollar commercial contract. The government sources interviewed indicated that other aerospace contractors had similar FMS and commercial contracts. In fact, in 1974 the value of export modification, conversion, and overhauls was 495 million dollars (Ref 60:180). If the ban on modifications to improve advanced weapon systems were to be rigorously enforced, the aerospace industry could lose a sizable portion of this business.

FMS and Co-production

One of President Carter's proposals was that co-production agreements would be banned on all future foreign military sales. Despite the President's views about co-production agreements on future foreign military sales, approximately half of the individuals interviewed felt that co-production would be a requirement on most major foreign military sales of the future. On the other hand, the other half did not feel that there would be co-production on future foreign military sales. However, they did agree that co-production, if allowed to occur, would probably involve the more industrialized nations such as Japan and NATO. Although co-production will probably exist on future foreign military sales, the economic effects of a ban on co-production is beyond the scope of this thesis.

Summary

Defense contractors are especially responsive to changes in US government policies and regulations. Each policy change which affects some facet of the defense contractor's business such as sales or profits influences the way the contractors do business. The deletion of the FMS profit factor reduced the contractors' profits on foreign military sales. This reduction in profits has the potential to affect many of the contractors' economic decisions and could lead to further erosion of the Defense Industrial

Base.

President Carter's FMS policy changes have not been fully implemented. In many cases there has not been enough time for the effects of those changes that have been implemented to be fully felt by the defense contractors. Empirical data on the effects of the President's policy changes was not available through government sources. However, the majority of the individuals interviewed expressed the opinion that President Carter's FMS policies, as presently enforced, have had little, if any, impact on foreign military sales. In addition They felt that if rigorously enforced, President Carter's proposals could create a reduction in FMS which would have a significant economic impact on defense contractors.

VII. SUMMARY AND CONCLUSIONS

The evolution of the present foreign military sales programs began in 1940 with the Lend Lease Act. The Lend Lease Act was followed by grant aid programs such as the Marshal Plan and numerous mutual security pacts. However, by the early 1960's US grant aid programs had grown to the point where they adversely affected the US economy, balance of payments, and the military supplies and equipment available to the US armed services. As a result the government implemented an aggressive program to convert grant aid programs into foreign military sales.

In the middle 1960's foreign military sales grew rapidly. In the period from 1964 to 1968 foreign military sales doubled, reaching one billion dollars in 1968. However, in the late 1960's and early 1970's the growth of FMS was even more dramatic. Foreign military sales grew from .97 billion dollars in 1967 to 9.4 billion dollars in 1975. As a result the DIB has experienced an increase in total military procurements (current dollars) despite large decreases in domestic military purchases.

Because of the decline in domestic military procurements and the rise in foreign military sales, the DIB has become somewhat dependent on FMS. As a result the DIB has become more sensitive to FMS policy changes. Several recent and proposed FMS policy changes which have the potential to economically affect the DIB include the deletion of the

one to four percent FMS profit factor, the placement of a ceiling on the annual value of foreign military sales, a ban on R&D efforts solely for FMS, and a ban on modifications of advanced weapon systems for FMS. These changes were previously discussed in Chapter VI.

The Effects of FMS Policy Changes

Empirical data by which to evaluate the economic effects of the previously mentioned FMS policy changes on the aerospace industry/DIB were not available for this thesis. As a result an attempt to measure these effects was made by interviewing government personnel knowledgeable in the field of FMS. The opinions and conclusions presented in this section represent for the most part the writer's interpretation of the interview responses and discussions. Supplemental information was also obtained from literature sources addressing FMS and the DIB.

The Deletion of the FMS Profit Factor

The deletion of the one to four percent profit factor for FMS from the weighted guidelines profit formula does not appear to have reduced contractor participation in foreign military sales. Aerospace FMS procurements have been bolstered by the sales of the F-15 and F-16. In addition, foreign military sales of older aircraft such as the F-4 and C-130 have continued to remain high. As a result it appears that aerospace FMS procurements will continue

to grow or at least remain stable through the early 1980's.

The FMS profit factor deletion has reduced aerospace contractor profits on FMS contracts by one to two percentage points. The interview responses indicated that this small of a reduction in profits would probably not have any short term effects on the DIB since the DIB was so heavily dependent on the volume of FMS for its business. However, the government personnel interviewed did indicate that lower profit levels could have long term effects on the orientation of the companies in the DIB. Possible effects mentioned included lower capital investment levels, reduced R&D efforts, and a gradual conversion from military to commercial products. In other words, the loss of the FMS profit factor could eventually lead to further erosion of the DIB if not offset by other factors.

The FMS Ceiling

The ceiling on foreign military sales has had little effect on limiting foreign military sales. In fact, the government personnel interviewed indicated very few FMS programs have had to consider the ceiling. This is partly because of the timing and manner in which the sales are made. The 1978 sales of F-15's to Saudi Arabia and the F-5's to Egypt were divided and placed on several different LOA's. This division may reflect the Saudi Arabian and Egyptian requirements for different years, but it also avoids the FMS ceiling in 1978.

The FMS ceiling does not appear to limit foreign military sales in the short term, but it does provide the potential for some long term reductions in foreign military sales. As long as foreign military sales can be delayed to future years there will probably be no reductions in FMS. However, an accumulation of delayed FMS contracts in a given year can reduce the number of sales available for that year. In addition, a collective accumulation of delayed contracts in several future years can extend the time period of any future delays. If the delays become too long, potential buyers might decide to purchase non-US equipment. In this sense foreign military sales could be reduced.

In short, it appears that the FMS ceiling will affect the volume of FMS very little, unless there are restrictions imposed on delaying sales to future years. As a result the FMS ceiling will probably have little effect on the DIB except to produce a more constant FMS sales volume.

R&D and Modifications for FMS

The proposals to ban R&D efforts solely for FMS and to ban modifications of advanced weapon systems for FMS have the potential to significantly affect the DIB. The R&D proposal seems to have the least effect of the two proposals since most R&D efforts can be construed as being for US weapon systems. Companies such as Northrop who are

heavily dependent on FMS could, however, be hurt by a ban on FMS R&D efforts, but in general it is too early to tell if an FMS R&D ban will significantly affect the DIB.

A ban on modifications of advance weapon systems for FMS could affect the DIB in several ways. Modifications, conversions, and overhauls of aircraft annually account for roughly 500 million dollars of the aerospace industry's export business. A rigid ban on FMS modifications could significantly reduce this portion of the aerospace industry's export business. However, different interpretations of "advanced weapon systems" could reduce the adverse effects of such a ban.

A ban on modifications could also affect the marketability of US weapon systems. Many aircraft systems are sold and then modified to the purchaser's needs and requirements. If modifications are not allowed, the attractiveness of the US products is somewhat diminished. This could reduce foreign military sales if other competing products could be modified to meet the customer's needs. As a result it appears that a ban on modifications of advanced weapon systems would not only reduce modification, conversion, and overhaul contracts, but it could also reduce future foreign military sales as well.

Recommendations for Further Study

This thesis has addressed several of the ways foreign military sales affect the US economy, the US government,

and the DIB. Several studies have been conducted which have presented an empirical analysis of the effects of FMS on the US economy and government. However, in the literature review for this thesis little data concerning the relationships between FMS and the DIB were found. One suggestion for further study is to perform an empirical analysis of FMS' support to the DIB.

A second suggestion for further study is to extend the scope this study with interviews with contractor representatives. This would remove this thesis' limitation of using only government personnel and provide an additional insight to the effects of FMS policy changes on the DIB.

BIBLIOGRAPHY

1. "Aerospace Aircraft," Financial World, 146: 28-30 (15 January 1977).
2. "Aerospace and Defense," Forbes, 121: 61-64 (January 9, 1978).
3. Aerospace Facts and Figures 1977/1978. New York: Aviation Week and Space Technology, 1977.
4. Aerospace Research Center. Aerospace and the U.S. Economy Its Role, Contributions, and Critical Problems. Report. Washington D.C.: Aerospace Industries Association of America, Inc., November 1971.
5. Aerospace Research Center, Aerospace Capital Formation of Inflation and Depreciation. Executive Summary. Washington D. C.: Aerospace Industries Association of America, Inc., April 1976.
6. Aerospace Profits vs Risks An Analysis of Impact on Industry Viability. Report. Washington D. C.: Aerospace Industries Association of America, Inc., June 1971.
7. Aerospace Research Center. International R&D Trends and Policies An Analysis of Implications for the U.S. Report. Washington D. C.: Aerospace Industries Association of America, Inc., January 1972.
8. "Aerospace Review and Forecast 1976/1977," Aerospace, 15: 2-5 (Spring 1977).
9. Air Force Manual 400-3. Logistics Foreign Military Sales. Manual. Washington D. C.: Department of the Air Force, 7 May 1974.
10. Alne, L. A. "Rationale for Military Exports," Aviation Week and Space Technology, 103: 7 (4 August 1975).
11. Anderson, William H. The Impact of Foreign Military Sales on the Industrial Base. Research Report. Maxwell Air Force Base, Alabama: Air War College, April 1976.

12. "Arms Export Financing, 1st Quarter 1977", Aviation Week and Space Technology, 106: 116 (6 June 1977).
13. Babione, Dale R. "Profit '76 Revisited," Defense Management Journal, 12: 41-46 (October 1976).
14. Bertrand, Harold E. The Defense Industrial Base Executive Summary. DOD Contract Report SD 321. Washington D. C.: Logistics Management Institute, August 1977. (AD AO44786).
15. Bertrand, Harold E., Steven C. Mayer, and Anthony J. Provenzano. The Defense Industrial Base. DOD Contract Report SD 321. Washington D. C.: Logistics Management Institute, August 1977. (AD AO44799).
16. Brownlow, Cecil. "Arms Export Curbs Expected to Bend," Aviation Week and Space Technology, 106: 85-87 (6 June 1977).
17. Butler, Hartman L., George J. Podrasky, and J. Devon Allen. "The Aerospace Industry Revisited," Financial Analyst Journal, 33: 22-35 (July-August 1977).
18. Carey, Omer L. The Military-Industrial Complex and United States Foreign Policy. Pullman: Washington State University Press, 1969.
19. "Carter Fires on Arms Exports," Aviation Week and Space Technology, 106: 17 (23 May 1977).
20. "Casualties of a Cut in Arms Sales Abroad," Business Week, 34-35 (25 April 1977).
21. Code of Federal Regulations, National Defense, Vol 32. Washington DC: Government Printing Office, 1976.
22. Comptroller General of the United States. Contractors' Research and Development Program Issues and Alternatives. PASD-78-82, Washington D. C.: United States General Accounting Office, 5 June 1975.
23. Comptroller General of the United States. Foreign Military Sales A Growing Concern. ID-76-51. Washington D. C.: United States General Accounting Office, 1 June 1976.

24. Congressional Budget Office. Budget Options for Fiscal Year 1978. Report to Senate and House Committees on the Budget. Washington D. C.: Congressional Budget Office, February 1977.
25. Congressional Budget Office. Budgetary Savings to the Department of Defense Resulting from Foreign Military Sales. Washington D. C.: Congressional Budget Office, 24 May 1976.
26. Congressional Budget Office. Foreign Military Sales and U.S. Weapon Costs. Washington D. C.: Congressional Budget Office, 5 May 1976.
27. Congressional Budget Office. The Effects of Foreign Military Sales on the U.S. Economy. Washington D. C.: Congressional Budget Office, 23 July 1976.
28. Council of Economic Advisors. Economic Report of the President. Report to Congress. Washington D. C.: Council of Economic Advisors, January 1977.
29. Deakin, M. D. "Pricing for Return on Investment," Management Accounting, 57: 43-44, (December 1975).
30. Department of Defense Instruction 2140.1. Pricing of Sales of Defense Articles and Services to Foreign Countries and International Organizations.
31. Department of Defense Directive 2140.2. Recoupment of Nonrecurring Cost on Sales of USG Products and Technology. Directive. Washington D. C.: Department of Defense, 5 January 1977.
32. Ellsworth, R. "Justifying Foreign Military Sales," Aviation Week and Space Technology, 107: 57-58 (22 August 1977).
33. "Exports Increase as Proportion of Military Business for the U.S.," Aviation Week and Space Technology, 107: 60-61 (31 October 1977).
34. "Federal Contract Report," Bureau of National Affairs, Inc., Report 733, 29 May 1978.
35. Feigl, Peter. "ASPR Changes Made to Assist Military Sales," Defense Industry Bulletin, 1: 2-5 (May 1965).

36. "Foreign Arms Sales Dilemma," Business Week, 79. (20 December 1976).
37. Gambill, Jack H. FMS Costing -- A Reverse Government Subsidy Report Maxwell AFB, Alabama: Air Command and Staff, April 1976. (AD B011899L).
38. Hammond, Michael E. "The Carter Defense Budget: A Frigate Navy and Its Implications," Financial World, 147: 20-25 (1 March 1978).
39. Harlamor, Slava W. "Future of Arms Sales Policy Questioned," Aviation Week and Space Technology, 107: 26-29 (January 16, 1978).
40. Harvey, David. "U. S. Aerospace Recovers," Defense and Foreign Affairs Digest, 6: 34-35, (January 1978).
41. Heiss, Klaus P. Aerospace Capital Formation Impact of Inflation and Depreciation Vol 1, Executive Summary. Report. Washington D. C.: Aerospace Industries Association of America, Inc., April 1976.
42. Hooper, John D. and William A. Trench. A Financial Analysis Approach Applicable to the Aerospace Industry, AFIT Thesis. Wright-Patterson AFB, Ohio, June 1977. AD AO044187.
43. Jones, T. V. "New Arms Export Policy," Aviation Week and Space Technology, 107: 9 (8 August 1977).
44. Kelly, John. Foreign Military Sales: The F/RF-4 Weapon Systems as a Special Case Study. Report. Maxwell AFB, Alabama: Air War College, April 1975. (AD B003859).
45. Kennedy, Gavin. The Economics of Defense. Totowa: Rowman and Littlefield, 1975.
46. Kozicharow, Eugene. "DOD Revises Policy on Export," Aviation Week and Space Technology, 106: 12-18 (12 September 1977).
47. Legislative Basis for Security Assistance Summary Sheet. Directorate of Procurement, Aeronautical Systems Division, Wright-Patterson AFB, September 1977.

48. Lessey, Kenric S., Jr. Economics of Military Exports Sales. Professional Study, Maxwell AFB, Alabama: Air War College, April 1975. (AD B003813).
49. McChesney, Jack Lester. The Evolution of the Foreign Military Sales Program and Its Impact on Defense Procurement. Doctoral Dissertation. Washington D. C.: George Washington University, May 1976. (AO A026854).
50. Miller, W. H. "Pentagon Frets Over Firms Sagging Interest in Contracts," Industry Week, 189: 14-16 (10 May 1976).
51. Parr, John D. Foreign Military Sales: A Defense Management Problem, Report. Maxwell AFB, Alabama: Air Command and Staff, May 1975.
52. "Problems Seen for Foreign Military Sales Cuts," Aviation Week and Space Technology, 107: 21 (18 July 1977).
53. "Profit is Not a Dirty Word," Aerospace, 15: 10-11 (Fall 1977).
54. Samuelson, Paul A. Economics (Seventh Edition). New York: McGraw-Hill Book Company, 1967.
55. Senate Committee on Foreign Relations. Arms Sales and Foreign Policy. Staff Study. Washington D. C.: U. S. Congress, 25 January 1967.
56. Shapley, Willis H., Don I. Phillips, and Herbert Roback. Research and Development in the Federal Budget FY 1978. Washington D. C.: American Association for the Advancement of Science, 1977.
57. The Budget of The United States Government Fiscal Year 1979. Washington, D. C.: US Government Printing Office, 1978. (SN 041-001-00160-3).
58. The Encyclopedia Americana International Edition, Vol 17. New York: Americana Corporation, 1968.
59. "The New Arms Export Policy," Aviation Week and Space Technology, 106: 9 (8 August 1977).
60. U. S. Code Congressional and Administrative News, 1976, Volumes 1-4. St. Paul: West Publishing Company, 1976.

61. U. S. Department of Commerce. U. S. Industrial Outlook 1977. Washington D. C.: Department of Commerce, January 1977. (SN 003-008-00174-2).
62. U. S. Labor Department. Bulletin 1672. Washington D. C.: U. S. Labor Department, 1976.
63. Weidenbaum, M. L. "New Kind of Defense Contractor?", Dunns, 103: 11, (May 1974).

INTERVIEWS AND CONTACTS

1. Richard Appleman, Pricing Directorate, ASD, Wright-Patterson AFB, Ohio.
2. Myron Bailey, Pricing Directorate, ASD, Wright-Patterson AFB, Ohio.
3. Carl Beealer, EF-111 SPO, ASD, Wright-Patterson AFB, Ohio.
4. Dennis Coogburn, F-16 SPO, ASD, Wright-Patterson AFB, Ohio.
5. Jack Falleur, Procurement Committee, ASD, Wright-Patterson AFB, Ohio.
6. Kevin Foster, F-4 PCO, ASD, Wright-Patterson AFB, Ohio.
7. Al Gobel, Procurement Directorate, ASD, Wright-Patterson AFB, Ohio.
8. Jim Huffman, F-15 SPO, ASD, Wright-Patterson AFB, Ohio.
9. Clancey Johnson, Procurement Committee, ASD, Wright-Patterson AFB, Ohio.
10. Joe Kennedy, ACO Northrop Corporation, Palmdale, California.
11. Bob Kinderman, F-4 PCO, ASD, Wright-Patterson AFB, Ohio.
12. Jim Liest, C-130 SPO, ASD, Wright-Patterson AFB, Ohio.
13. Malcomb Murphy, ACO Lockheed Georgia, Marietta, Georgia/
14. Bill Naylor, F-15 SPO, ASD, Wright-Patterson AFB, Ohio.
15. Jack Riggley, C-130 SPO, ASD, Wright-Patterson AFB, Ohio.
16. John Welsh, C-130 SPO, ASD, Wright-Patterson AFB, Ohio.

CONFERENCES AND SEMINARS

1. ASD Pricing Symposium, 1978, Wright-Patterson AFB, Ohio.

APPENDIX A

SUMMARY OF MAJOR POLICY PROVISIONS

OF THE ARMS EXPORT CONTROL ACT OF 1976

PL 94-329

APPENDIX A

SUMMARY OF MAJOR POLICY PROVISIONS OF THE ARMS EXPORT CONTROL ACT OF 1976 PL 94-329

A. Grant Military Assistance

The bill makes substantial changes in US policy with respect to the grant military assistance program (MAP). For the first time since the inception of such programs in the days immediately following the Second World War, the committee has taken positive action to phase out grant MAP. To accomplish this the bill -

(1) Terminates the authority to furnish grant military assistance effective September 30, 1977, unless specifically authorized by the Congress in specific amounts and for specified countries (sec. 105);

(2) Provides for the termination of military assistance advisory groups, military missions, or other organizations of US military personnel performing similar duties under the Foreign Assistance Act effective October 1, 1977, unless specifically authorized by the Congress (sec. 104); and

(3) Establishes grant military education and training as a separate authority (sec. 106).

The bill also prohibits the furnishing of security assistance to any foreign government which engages in a consistent pattern of gross violations of internationally recognized human rights, except in exceptional circumstances justified to the Congress (sec. 301).

B. Foreign Military Sales

Enactment of this bill will also restructure US arms sales policies to provide for increased congressional supervision and review of all aspects of the foreign military sales program. Specifically, the bill-

(1) Places an annual ceiling of \$9 billion on the aggregate value of defense articles and defense services which may be sold by the US Government or by commercial entities in the United States (sec. 213);

(2) Restricts the sale of major defense equipment to government-to-government transactions. To accomplish this the bill defines "major defense equipment" (sec. 216) and prohibits the issuance of a license to export major defense equipment to a foreign country under a sales contract in the amount of \$25 million or more except in connection with sales under the Foreign Military Sales Act (sec. 212);

(3) Requires an annual report estimating the level of arms to be sold to each country under the authority of the Foreign Military Sales Act with a full and complete justification of how sales to each country will strengthen

the security of the United States and promote world peace (sec. 209);

(4) Requires reports to the Secretary of State on political contributions, gifts, commissions, and fees paid or offered or agreed to be paid, by any person to secure arms sales whether through government-to-government or commercial channels (sec. 604); and

(5) Requires a comprehensive study of US arms sales policies and practices, both government-to-government and commercial, and requires the President to report the findings of this study not later than 1 year after enactment of the act (sec. 202).

C. Other Provisions

The bill, moreover, contains provisions on a number of other important international issues and problems. Among them are provisions which -

(1) Prohibit the furnishing of assistance to any nation or group for the purpose of promoting or augmenting the military capacity of the recipient to conduct military or paramilitary operations in Angola, unless such assistance is specifically authorized by subsequent legislation (sec. 404);

(2) Require the President, except in extraordinary circumstances, to terminate all assistance authorized under the Foreign Assistance Act to any government which grants sanctuary from prosecution to any

individual or group that committed an act of international terrorism (sec. 303);

(3) Establish US policy that no security assistance should be furnished to any foreign country if the laws, regulations, official policies, or governmental practices of such country discriminate against any US citizen and prevent him or her from participating in the furnishing or sale of such defense articles and defense services because of the race, religion, national origin, or sex of such US citizen (sec. 302);

(4) Set ceilings on assistance to Korea, including (a) a ceiling of \$290 million for all types of military assistance for fiscal year 1976, the transition period and fiscal year 1977, and (b) a ceiling of \$175 million on Public Law 480, Title I, food over the same period (sec. 413);

(5) Express the sense of the Congress that the President should enter into negotiations with the Soviet Union in an effort to limit the deployment of United States and Soviet naval, air, and land forces in the Indian Ocean region (sec. 408);

(6) Express the sense of the Congress that the joint resolution relating to US technicians in the Sinai (Public Law 94-110) and the authorizations in this bill do not constitute congressional approval of any commitment, understanding, assurance, promise, or agreement which might have been made by any official of the US Government to any government in the Middle East, other than the US proposal

government in the Middle East, other than the US proposal for an early-warning system in the Sinai (sec. 401);

(7) Prohibit any military or security supporting assistance, or foreign military credit sales to Chile (sec. 406) and set a ceiling on the amount of economic assistance that can be furnished to Chile in fiscal years 1976 and 1977 (sec. 407);

(8) Provide relief and rehabilitation assistance to victims of war and natural disasters in Italy, Cyprus, and Lebanon (secs. 402, 416, and 417);

(9) Express the sense of Congress that the President immediately evaluate the food needs of Portugal and provide assistance as necessary under relevant provisions of law (sec. 410);

(10) Call upon the President to communicate to the Government of Mexico US concern for American citizens arrested in Mexico (sec. 409);

(11) Provide additional funds to the International Atomic Energy Agency for strengthening its safeguards against the diversion of nuclear materials and possible nuclear proliferation (sec. 505); and

(12) Legislate safeguards against illegal payments to officials of countries receiving international security assistance from US corporations, or attempts at extortion (sec. 607).

(U. S. Code Congressional and Administrative News: 1385-91)

APPENDIX B

TEXT OF THE STATEMENT ON

CONVENTIONAL ARMS TRANSFER POLICY

APPENDIX B
TEXT OF THE STATEMENT ON
CONVENTIONAL ARMS TRANSFER POLICY

Issued by President Carter on May 19, 1977

The virtually unrestrained spread of conventional weaponry threatens stability in every region of the world. Total arms sales in recent years have risen to over \$20 billion, and the United States accounts for more than one-half of this amount. Each year, the weapons transferred are not only more numerous, but also more sophisticated and deadly. Because of the threat to world peace embodied in this spiralling arms traffic; and because of the special responsibilities we bear as the largest arms seller, I believe that the United States must take steps to restrain its arms transfers.

Therefore, shortly after my Inauguration, I directed a comprehensive review of US conventional arms transfer policy, including all military, political, and economic factors. After reviewing the results of this study, and discussing those results with members of Congress and foreign leaders, I have concluded that the United States will henceforth view arms transfers as an exceptional foreign policy implement, to be used only in instances where it can be clearly demonstrated that the transfer contributes to our

national security interests. We will continue to utilize arms transfers to promote our security and the security of our close friends. But, in the future, the burden of persuasion will be on those who favor a particular arms sale, rather than those who oppose it.

To implement a policy of arms restraint, I am establishing the following set of controls, applicable to all transfers except those to countries with which we have major defense treaties (NATO, Japan, Australia, and New Zealand). We will remain faithful to our treaty obligations, and will honor our historic responsibilities to assure the security of the State of Israel. These controls will be binding unless extraordinary circumstances necessitate a Presidential exception, or where I determine that countries friendly to the United States must depend on advanced weaponry to offset quantitative and other disadvantages in order to maintain a regional balance.

1. The dollar volume (in constant FY 1976 dollars) of new commitments under the Foreign Military Sales and Military Assistance Programs for weapons and weapons-related items in FY 1978 will be reduced from the FY 1977 total. Transfers which can clearly be classified as services are not covered, nor are commercial sales, which the US Government monitors through the issuance of export licenses. Commercial sales are already significantly restrained by existing legislation and Executive Branch policy.

2. The United States will not be the first supplier to introduce into a region newly-developed, advanced weapons systems which could create a new or significantly higher combat capability. Also, any commitment for sale or coproduction of such weapons is prohibited until they are operationally depoloyed with US forces, thus removing the incentive to promote foreign sales in an effort to lower unit costs for Defense Department procurement.

3. Development of significant modification of advanced weapons systems solely for export will not be permitted.

4. Coproduction agreements for significant weapons, equipment, and major components (beyond assembly of subcompoments) and the fabrication of high-turnover spare parts) are prohibited. A limited class of items will be considered for coproduction arrangements, but with restrictions on third-country exports, since these arrangements are intended primarily for the coproducer's requirements.

5. In addition to existing requirements of the law, the United States, as a condition of sale for certain weapons, equipment, or major components, may stipulate that we will not entertain any requests for retransfers. By establishing at the outset that the United States will not entertain such requests, we can avoid unnecessary bilateral friction caused by later denials.

6. An amendment to the International Traffic in Arms Regulations will be issued, requiring policy level

authorization by the Department of State for actions by agents of the United States or private manufacturers, which might promote the sale of arms abroad. In addition, embassies and military representatives abroad will not promote the sale of arms and the Secretary of Defense will continue his review of government procedures, particularly procurement regulations, which may provide incentives for foreign sales.

In formulating security assistance programs consistent with these controls, we will continue our efforts to promote and advance respect for human rights in recipient countries. Also, we will assess the economic impact of arms transfers to those less-developed countries receiving US economic assistance.

I am initiating this policy of restraint in the full understanding that actual reductions in the worldwide traffic in arms will require multilateral cooperation. Because we dominate the world market to such a degree, I believe that the United States can, and should, take the first step. However, in the immediate future, the United States will meet with other arms suppliers, including the Soviet Union, to begin discussions of possible measures for multilateral action. In addition, we will do whatever we can to encourage regional agreements among purchasers to limit arms imports.

APPENDIX C
INTERVIEW FORMAT

APPENDIX C

INTERVIEW FORMAT

The answers to these interview questions are intended to provide the researcher with a background and data base for examining FMS policy changes. All questions are to be answered with respect to the company's aircraft divisions with which you are familiar. Your answers will be considered confidential and will not be identified with a single source or office. Your help and participation in these interviews is greatly appreciated.

Topic - The following questions are directed at the economic affects of foreign military sales on defense contractors.

1. What companies form the basis or source of your information in answering these questions?
2. What percentage of these companies' aerospace contracts are commercial, FMS, and DOD?
3. If FMS were deleted or significantly reduced, what percentage of the company's foreign military sales of aircraft and aircraft parts could be made up by commercial or DOD business?
4. What is the annual dollar value of the company's foreign military sales of aircraft and aircraft parts?
5. What percentage of the companys aerospace division's capital investments are made because of FMS commitments or prospects?
 - a. Replacement equipment?
 - b. New equipment?
6. What is the annual dollar value of the company's, aircraft division, capital investments?
7. The recent increase in progress payments from 80 to 90 percent was intended to improve the contractor's cash flow. To what extent did this change improve the contractor's cash flow?

0-20%	20-40%	40-60%	60-80%	80-100%
-------	--------	--------	--------	---------

8. To what extent did the change in progress payments impact foreign military sales?

9. What percentage of the company's aerospace R&D efforts are directed towards military applications and hardware?

10. What percentage of the company's aerospace R&D efforts would still be directed towards military applications and hardware if FMS markets were deleted or significantly reduced?

11. What is the annual dollar value of the company's aerospace R&D efforts?

12. To what extent does FMS reduce US defense contract prices?

0-20%	20-40%	40-60%	60-80%	80-100%
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13. In what areas or ways does FMS reduce the costs of US defense contracts?

14. What risks does a company which participates in foreign military sales incur?

Topic - The following questions relate to the deletion of the one to four percent profit factor for FMS from the weighted guidelines.

1. In your opinion what was the original purpose of the FMS profit factor?
2. What was the average FMS profit factor awarded prior to its deletion?
3. In your opinion why was the FMS profit factor deleted?
4. Did the deletion of the FMS profit factor accomplish its purpose?
5. Is it possible to recover profits lost by the deletion of the FMS profit factor in other sections of the weighted guidelines? YES ____ NO ____
How?
6. Can you suggest ways that the loss of the FMS profit factor can be offset by other than the weighted guideline?
7. What was the reaction of the contractors to the deletion of the FMS profit factor?
8. Since the deletion of the FMS profit factor, have the contractors:
 - a. Negotiated their FMS contracts differently?
 - b. Demanded more profits?
 - c. Refused contracts?
 - d. Other?

9. Did Profit 76 increase or decrease the profits
awarded on defense contracts? Increase _____ Decrease _____

To what extent?

0-1%

1-2%

2-3%

3-4%

4-5%

Topic - The following questions concern President Carter's 19 May 1977 policy statement on conventional arms transfers.

1. How familiar are you with the contents of President Carter's policy statement on conventional arms transfers?
not at all very little somewhat moderately intimately

2. To what extent could the aerospace divisions of those companies with which you are familiar with increase their foreign military sales if there were no annual ceilings on these sales?

0-20% 20-40% 40-60% 60-80% 80-100%

3. Can you give a dollar figure for this increase?

4. What percentage of the current foreign military sales by the company's aerospace division was developed solely for FMS?

5. What percentage of the current foreign military sales by the company's aerospace division is for modifications to improve advanced weapon systems for FMS?

6. To what extent will future FMS require coproduction as a condition of sale? (Percentage of FMS dollars)

0-20% 20-40% 40-60% 60-80% 80-100%

7. Is the impact on the costs of other DOD programs considered in making the decision to sell one type of aircraft and not another in FMS markets?

8. What was the cost savings to the government generated by the extra sales of the F-16 after the F-18L was not allowed to be sold in the FMS market?

9. To what extent does the changes in unit costs of aircraft generated because of FMS sales decisions affect the different services fiscal justification of their respective aircraft programs?

APPENDIX D

TABLES

Table 3-4

U. S. EXPORTS AND EXPORTS OF AEROSPACE PRODUCTS

Calendar Years 1960 to Date
(Millions of Dollars)

Year	TOTAL Exports of U.S. Merchandise	Exports of Aerospace Products				
		TOTAL	Percent of Total U.S. Exports	Civil		Military
				Trans- ports	Other	
1960	\$ 20,375	\$ 1,726	8.5%	\$ 480	\$ 609	\$ 637
1961	20,754	1,653	8.0	263	615	773
1962	20,431	1,923	9.4	259	651	1,013
1963	23,062	1,627	7.1	191	541	895
1964	26,156	1,608	6.1	211	553	844
1965	27,127	1,618	6.0	353	501	764
1966	29,884	1,673	5.6	421	614	638
1967	31,142	2,248	7.2	611	769	868
1968	34,199	2,994	8.8	1,200	1,089	705
1969	37,462	3,138	8.4	947	1,080	1,111
1970	42,590	3,405	8.0	1,283	1,233	889
1971	43,492	4,203	9.7	1,567	1,513	1,123
1972	48,959	3,795	7.8	1,119	1,835	841
1973	70,246	5,142	7.3	1,664	2,124	1,354
1974	97,144	7,095	7.3	2,655	2,618	1,822
1975 ^r	106,102	7,792	7.3	2,397	2,926	2,469
1976	113,323	7,859	6.9	2,476	3,203	2,175

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity and Country," Report FT 410 (Monthly); Bureau of the Census, "Highlights of U.S. Export and Import Trade," Report FT 990 (Monthly).
r Revised.

(Aerospace Facts and Figures, 1977/78 : 19)

Table 4-1a

PAST SAVINGS FISCAL YEARS 1972-76
(Millions of Current Dollars)

System	Total Savings	Research and Development	Learning Curve	Overhead	Production Line Cap.	Other
M60A1, Combat Tank	124.1	1.9	0.0	59.5	0.0	62.7
M72B, Combat Engineer Vehicle	1.1	0.0	0.0	0.7	0.0	0.4
M60A1, Tank Chassis for AVLB Launcher	2.0	0.1	0.0	1.5	0.0	0.4
AVLB Launcher	0.2	0.0	0.0	0.0	0.0	0.1
AVL Bridge	0.1	0.0	0.0	0.0	0.0	0.1
M113A1 APC - Family roll-up	27.4	0.0	7.7	15.6	2.5	1.6
SP8" M110 Howitzer	14.5	0.7	5.4	6.7	1.0	1.0
M57B Recovery Vehicle	5.8	0.6	4.2	0.5	0.0	1.0
SP 155M4, M109A1B Howitzer	16.5	1.4	0.0	13.6	1.5	0.0
M88A1 Recovery Vehicle	0.0	0.0	0.0	0.0	0.0	0.0
AA, SP, M163 (VULC) Gun	5.8	0.0	0.0	5.3	0.5	0.0
H1 Helicopter Series	36.4	4.9	0.3	31.3	0.0	0.0
Dragon	0.0	0.0	0.0	0.0	0.0	0.0
Tow	89.6	25.5	21.8	5.7	0.0	36.6
Chapparat Launcher	0.0	0.0	0.0	0.0	0.0	0.0
Chapparat (GM)	0.0	0.0	0.0	0.0	0.0	0.0
Hawk Missile System	25.3	8.3	5.7	11.3	0.0	0.0
Lance Missile System	10.0	4.0	0.0	0.0	6.0	0.0
Phoenix	19.1	15.5	1.2	0.3	0.0	2.1
Sidewinder (AIM-9L)	0.0	0.0	0.0	0.0	0.0	0.0
P-3	1.2	1.2	0.0	0.0	0.0	0.0
S-3A	0.0	0.0	0.0	0.0	0.0	0.0
E-2C	0.0	0.0	0.0	0.0	0.0	0.0
F-14	229.2	168.6	20.6	40.1	0.0	0.0
A-7	1.5	0.2	1.3	0.0	0.0	0.0
Harpoon	22.0	3.4	4.6	10.2	0.0	3.8
F-15	0.0	0.0	0.0	0.0	0.0	0.0
F-16	0.0	0.0	0.0	0.0	0.0	0.0
F-5E/F	40.0	18.8	8.0	9.6	0.0	3.6
AWACS	0.0	0.0	0.0	0.0	0.0	0.0
AIM-9B Mod. to AIM-9S	0.0	0.0	0.0	0.0	0.0	0.0
Maverick	5.6	5.6	0.0	0.0	0.0	0.0
F-4E	299.4	25.4	1.2	263.6	9.0	0.0
Pave Spike	0.0	0.0	0.0	0.0	0.0	0.0
EOGB II	5.9	0.0	0.5	0.0	0.0	5.4

Source: Department of Defense

(Budgetary Cost Savings to the Department of Defense
Resulting From Foreign Military Sales: 8)

Table 4-1b

ESTIMATED FUTURE SAVINGS FISCAL YEARS 1977-81
(Millions of current dollars)

System	Total Savings	Research and Development	Learning Curve	Overhead	Production Line Gap	Other
M60A1, Combat Tank	335.7	3.9	0.0	216.2	0.0	115.6
M720, Combat Engineer Vehicle	11.4	0.3	0.0	7.2	0.0	3.9
M60A1, Tank Chassis for AVLB Launcher	7.2	0.2	0.0	5.8	0.0	1.3
AVLB Launcher	0.3	0.0	0.0	0.0	0.0	0.3
AVLB Bridge	0.4	0.0	0.0	0.0	0.0	0.4
M113A1 APC - Family roll-up	91.3	0.0	26.9	54.7	9.5	0.2
SP8" M110 Howitzer	0.2	0.2	0.0	0.0	0.0	0.0
M578 Recovery Vehicle	5.1	0.6	1.7	2.8	0.0	0.0
SP 155MM, M109A1B Howitzer	53.9	2.3	5.9	37.3	8.4	0.0
M56A1 Recovery Vehicle	5.7	0.0	0.0	5.7	0.0	0.0
AA, SP, M163 (VULC) Gun	17.9	0.0	0.0	15.1	2.8	0.0
H1 Helicopter Series	27.1	3.9	0.7	19.0	3.5	0.0
Dragon	40.7	20.7	17.5	2.5	0.0	0.0
Tow	75.9	23.6	31.4	8.0	5.0	7.9
Chapparral Launcher	17.0	4.5	8.6	1.6	2.3	0.0
Chapparral (CM)	11.6	3.7	2.7	1.5	3.7	0.0
Hawk Missile System	63.5	23.4	9.5	30.6	0.0	0.0
Lance Missile System	60.0	6.0	0.0	0.0	54.0	0.0
Phoenix	13.5	0.0	4.5	1.2	0.0	7.8
Sidewinder (AIM-9L)	6.1	0.0	6.1	0.0	0.0	0.0
P-3	6.8	4.8	0.0	2.0	0.0	0.0
S-3A	13.5	7.5	0.0	2.0	0.0	4.0
E-2C	16.6	6.8	0.0	9.8	0.0	0.0
F-14	0.0	0.0	0.0	0.0	0.0	0.0
A-7	4.1	0.5	3.6	0.0	0.0	0.0
Harpoon	94.5	49.7	20.0	10.3	0.0	14.5
F-15	70.1	40.0	30.1	0.0	0.0	0.0
F-16	126.0	67.7	43.7	14.6	0.0	0.0
F-5E/F	67.0	23.0	11.6	24.9	0.0	7.5
AWACS	338.6	219.9	118.8	0.0	0.0	0.0
AIM-9B Mod. to AIM-9S	3.0	0.4	0.0	0.0	0.0	2.6
Maverick	114.8	17.2	58.5	0.0	34.1	5.0
F-4E	113.6	10.8	0.0	102.6	0.0	0.0
Pave Spike	1.0	1.0	0.0	0.0	0.0	0.0
EOGB II	1.5	.7	0.0	0.0	0.0	0.7

Source: Department of Defense

(Budgetary Cost Savings to the Department of Defense
Resulting From Foreign Military Sales: 9)

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Table 4-1c

ESTIMATED TOTAL SAVINGS AND SALES FISCAL YEARS 1972-81

(Millions of Current Dollars)

System	Total Sales	Total Savings	Research and Development	Learning Curve	Overhead	Production Line Gap	Other
M60A1, Combat Tank	1,232.7	459.8	5.8	0.0	275.7	0.0	175.3
M729, Combat Engineer Vehicle	26.9	12.4	0.3	0.0	7.9	0.0	4.2
M60A1, Tank Chassis for AVLB Launcher	46.9	9.2	0.3	0.0	7.3	0.0	1.7
AVLB Launcher	53.1	0.4	0.0	0.0	0.0	0.0	0.4
AVL Bridge	10.5	0.5	0.0	0.0	0.0	0.0	0.5
M113A1 APC - Family roll-up	1,345.2	112.7	0.0	34.6	70.3	12.0	1.8
SP8" M110 Howitzer	21.8	14.7	0.8	5.4	6.7	1.6	0.0
M578 Recovery Vehicle	50.9	10.8	1.1	5.9	3.3	0.6	0.0
SP 155MM, M109A1B Howitzer	241.1	70.4	3.7	5.9	50.9	9.8	0.0
M58A1 Recovery Vehicle	84.9	5.7	0.0	0.0	5.7	0.0	0.0
AA, SP, M163 (VULC) Gun	205.8	23.7	0.0	0.0	20.4	3.3	0.0
H1 Helicopter Series	601.0	63.5	8.8	1.0	50.3	3.5	0.0
Dragon	291.0	40.7	20.7	17.5	2.5	0.0	0.0
Tow	670.7	165.5	49.1	53.2	13.7	5.0	44.5
Chapparral Launcher	133.0	17.0	4.5	8.6	1.6	2.3	0.0
Chapparral (GM)	58.0	11.6	3.7	2.7	1.5	3.7	0.0
Hawk Missile System	181.1	88.8	31.7	15.2	41.9	0.0	0.0
Lance Missile System	297.0	70.0	10.0	0.0	0.0	60.0	0.0
Phoenix	193.0	32.6	15.5	5.7	1.5	0.0	9.9
Sidewinder (AIM-9L)	34.1	6.1	0.0	6.1	0.0	0.0	0.0
P-3	249.1	8.0	6.0	0.0	2.0	0.0	0.0
S-3A	350.0	13.5	7.5	0.0	2.0	0.0	4.0
E-2C	111.1	16.6	6.8	0.0	9.8	0.0	0.0
F-14	1,412.2	229.2	168.6	20.6	40.1	0.0	0.0
A-7	206.3	5.6	0.7	4.9	0.0	0.0	0.0
Harpoon	225.4	116.5	53.1	24.5	20.5	0.0	18.5
F-15	240.0	70.1	40.0	30.1	0.0	0.0	3.5
F-16	885.6	125.0	67.7	43.7	14.6	0.0	0.0
F-5E/F	1,683.6	107.0	41.8	19.6	34.5	0.0	11.1
AWACS	3,476.0	333.5	219.8	118.3	0.0	0.0	0.0
AIM-9B Mod. to AIM-9S	8.8	3.0	0.4	0.0	0.0	0.0	2.6
Maverick	241.5	120.4	22.8	58.5	0.0	34.1	5.0
F-4E	2,142.0	413.0	36.2	1.2	366.6	9.0	0.0
Pave Spike	20.0	1.0	1.0	0.0	0.0	0.0	0.0
EOGB II	14.3	7.4	0.0	1.3	0.0	0.0	6.2

Source: Department of Defense

(Budgetary Cost Savings to the Department of Defense
Resulting From Foreign Military Sales: 10)

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Table 5-1

PROCUREMENTS FOR FOREIGN SECTOR

(Millions of Current Dollars)

Fiscal Year	Group	Aircraft	Missiles	Ships	Vehicles & Weapons	Ammunition	Electronics	Total
1967	FMS ¹	437	85	180	141	60	71	974
	MAP ¹	275	39	108	152	95	69	738
	Commercial	107	21	44	34	15	17	238
	Total	819	145	332	327	170	157	1,950
1968	FMS ¹	378	122	8	135	85	69	795
	MAP ¹	242	44	29	133	76	66	590
	Commercial	122	39	3	43	28	24	259
	Total	740	205	40	311	189	159	1,644
1969	FMS ¹	914	279	18	159	94	87	1,551
	MAP ¹	195	48	17	102	49	38	449
	Commercial	148	45	3	26	15	14	251
	Total	1,257	372	38	287	158	139	2,251
1970	FMS ¹	382	98	56	105	106	173	920
	MAP ¹	139	27	28	90	47	58	389
	Commercial	182	47	27	50	50	82	438
	Total	703	172	111	245	203	313	1,747
1971	FMS ¹	1,050	152	47	184	128	91	1,652
	MAP ¹	270	30	39	228	148	73	788
	Commercial	252	37	11	44	31	22	397
	Total	1,572	219	97	456	307	186	2,837
1972	FMS ¹	2,214	261	59	350	235	132	3,251
	MAP ¹	194	21	41	151	109	32	548
	Commercial	288	34	8	46	30	17	423
	Total	2,696	316	108	547	374	181	4,222
1973	FMS ¹	2,419	815	84	122	207	131	3,778
	MAP ¹	259	48	20	95	119	42	583
	Commercial	232	78	8	12	20	13	363
	Total	2,910	941	112	229	346	186	4,724
1974	FMS ¹	4,540	769	1,137	1,510	625	323	8,904
	MAP ¹	269	26	43	83	344	24	789
	Commercial	256	43	64	85	35	18	501
	Total	5,065	838	1,244	1,678	1,004	365	10,194
1975	FMS ¹	3,357	1,741	1,907	902	1,218	281	9,406
	MAP ¹	182	59	56	59	209	19	584
	Commercial	227	118	129	61	82	19	636
	Total	3,766	1,918	2,092	1,022	1,509	319	10,626

¹"Construction" deleted from FMS and MAP.

(The Defense Industrial Base: 35)

Vita

Stephen A. Henry was born in Washington, D. C. on October 7, 1949. He graduated from A&M Consolidated High School in College Station, Texas in 1967 and attended Texas A&M University from which he graduated in 1971 with a bachelor's degree in Aerospace Engineering. While at Texas A&M he was a Distinguished Military Graduate and received his Air Force commission.

In the Spring of 1973, after completing navigator and navigator-bombardier training at Mather AFB, California he was assigned to the 410th Bomb Wing, K. I. Sawyer AFB, Michigan. At K. I. Sawyer he served as an instructor navigator, radar navigator, wing scheduler, and wing bombing and navigation officer. He received his regular commission in 1976 and entered the Air Force Institute of Technology in June of 1977.

He is married to the former Maxine Williams of Baytown, Texas. They have a daughter and a son, Laura and Robbie.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This research effort was conducted to analyze the potential impact of several recent foreign military sales (FMS) policy changes on the Defense Industrial Base (DIB) and in turn the Department of Defense (DOD). Policy changes examined include the deletion of the one to four percent profit factor for FMS contracts from the weighted guidelines profit formula and President Carter's 19 May 1977 policy statement on		

conventional arms transfers.

The analysis of the effects of FMS policy changes began by examining the effects of FMS on the US economy, US government, and the DIB. This portion of the research effort provided the background for the evaluation of the effects of FMS policy changes. This portion also found that FMS has a significant effect on the US economy, government, and DIB.

The final portion of the analysis is based on interviews with government personnel associated with FMS contracts. The analysis of the interview responses indicated that the FMS policy changes examined had very few short term effects on the DIB. However, several of the policy changes examined did have the potential to significantly affect the DIB in the future.